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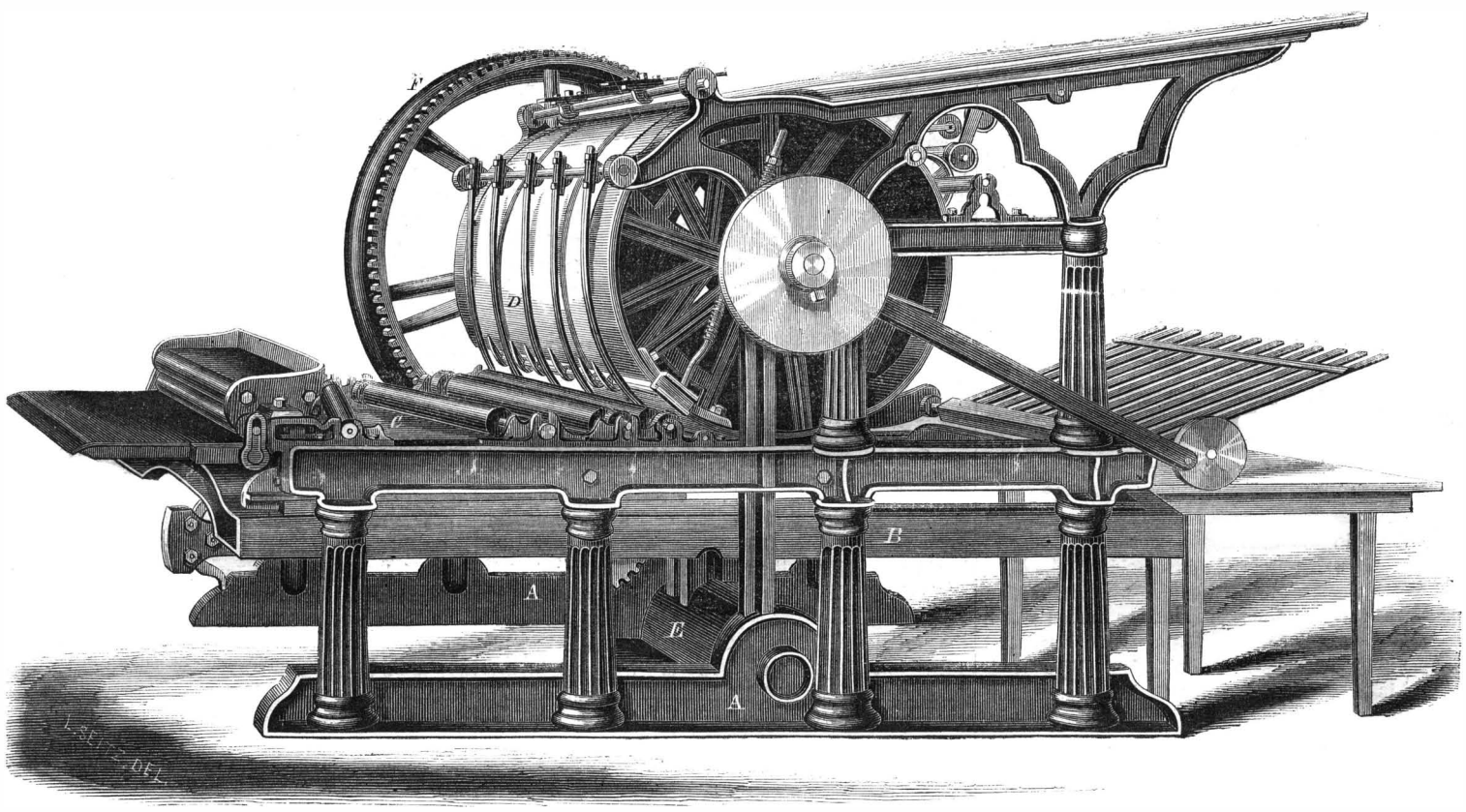
Improved Printing Press.

On all kinds of work for which a large printing press is required, especially in a country office where the proprietor can purchase but one press, there is none so well adapted as a *first-class* drum cylinder press of the present day; but as the prices of many of these presses are far beyond the means of most proprietors of country newspapers, the attention of inventors has for years been devoted to the production of a machine which should possess all the advantages of a first-class press, and yet come within the means of country printers.

The inventor of the press illustrated above believes he has accomplished completely the long sought object, by producing a press which has all the good qualities of the first-class presses, besides being durable and exceedingly simple, and therefore, modest in price.

It may be easily understood by the following description: A represents the sides of press, and B the track in which the form-bed C slides; said track forms part of the side, or if made separate, is bolted to it. D is the cylinder. The sides A are connected with each other by the cross-girt E, which together form the only frame-work of the press.

As nearly the whole strain in working the press comes upon the cross girt E, this is made very heavy, and placed directly under the line of impression, and it is provided with two impression bearings, which, together with those in the ends of the bed, make four points of bearing instead of two, as has heretofore been the practice. This allows the bed to be made much lighter, thus securing ease of running. Another point of importance in this invention is the method of attaching the fly-wheel to the driving gear. This is done by extending the main or cylinder shaft through the cylinder far enough to form a bearing for the fly-wheel—which, by a pinion gear fastened to it (not shown in the cut) turning upon the main shaft, making several revolutions to one of the cylinder, and gearing into a corresponding wheel on the lower shaft—drives the bed. The distribution of the ink, which is very thorough, is accomplished by what may be termed a "table" or surface distribution, in contradistinction to the geared cylindrical distribution, thus doing away with all gearing about it.



POTTER'S IMPROVED PRINTING PRESS.

The advantages claimed by the inventor for this press, are as follows: The manner in which the frame-work is put together dispenses with many of the heavy, cumbersome, and expensive parts of the machine. In combination with this, the manner of obtaining the bearings of the bed, thus dispensing with much weight in it, rendering the press easy running. The manner in which the fly wheel, with its driving gear, is attached to the main shaft, which economizes space, reduces the number of bearings, and thereby reduces the back-lash in the gearing, and the consequent liability to slur or mis-register. The proper steps are being taken by the inventor, C. Potter, Jr., for securing a patent for the above improved press; and any further information may be had by application to him, at No. 10 Spruce street, New York, or of the builders, Potter, Cottrell & Babock, Westerly, R. I.

A Floating Menagerie.

An Italian vessel arrived from the coast of Africa the other day, and is now lying in the wharves in South Brooklyn, having for a cargo several lions, one or two tigers, a number of other wild and ferocious animals, about a hundred monkeys, and at least two thousand rare and curious birds. The vessel is a perfect floating menagerie, and the roaring and bellowing of the animals, the chattering of the monkeys, and the warbling and shrill whistling of the birds makes a discord most novel and not altogether pleasant to the neighborhood. Strange as is the cargo of the vessel, she has a crew quite as singular. The most of them are Nubians, as black as soot, and garbed in the costume of their native country. They are in their turbans, flowing robes and wide trowsers, queer-looking sailors enough, but are said to be very capable and efficient.

State Fairs for 1864.

Having had frequent inquiry from subscribers in regard to the time for holding State Fairs, we subjoin a list so far as known:

Illinois	Decatur	Sept. 12-17.
New England	Springfield, Mass.	Sept. 6- 9.
Ohio	Columbus	Sept. 13-16
American Pom. Society	Rochester	Sept. 13.
New York	Rochester	Sept. 20-23.
Michigan	Kalamazoo	Sept. 20-23.
Upper Canada	Hamilton	Sept. 26-30.
Iowa	Burlington	Sept. 27-30.
Wisconsin	Janesville	Sept. 27-30.
Pennsylvania	Easton	Sept. 27-30.
Indiana	Indianapolis	Oct. 2- 8.
Grape and Wine Show	Cleveland, Ohio	Sept. 27-30.

A letter from Newburyport, says: "The people are cutting large quantities of peat, the recent dry season being very favorable for its cutting. A great deal had been hauled off to dry, thus clearly showing that one class are free from the high price of coal and wood. There is plenty of peat to be had on the meadows."

THE Illinois State Fair will be held in Septembe from the 12th to the 17th, inclusive.

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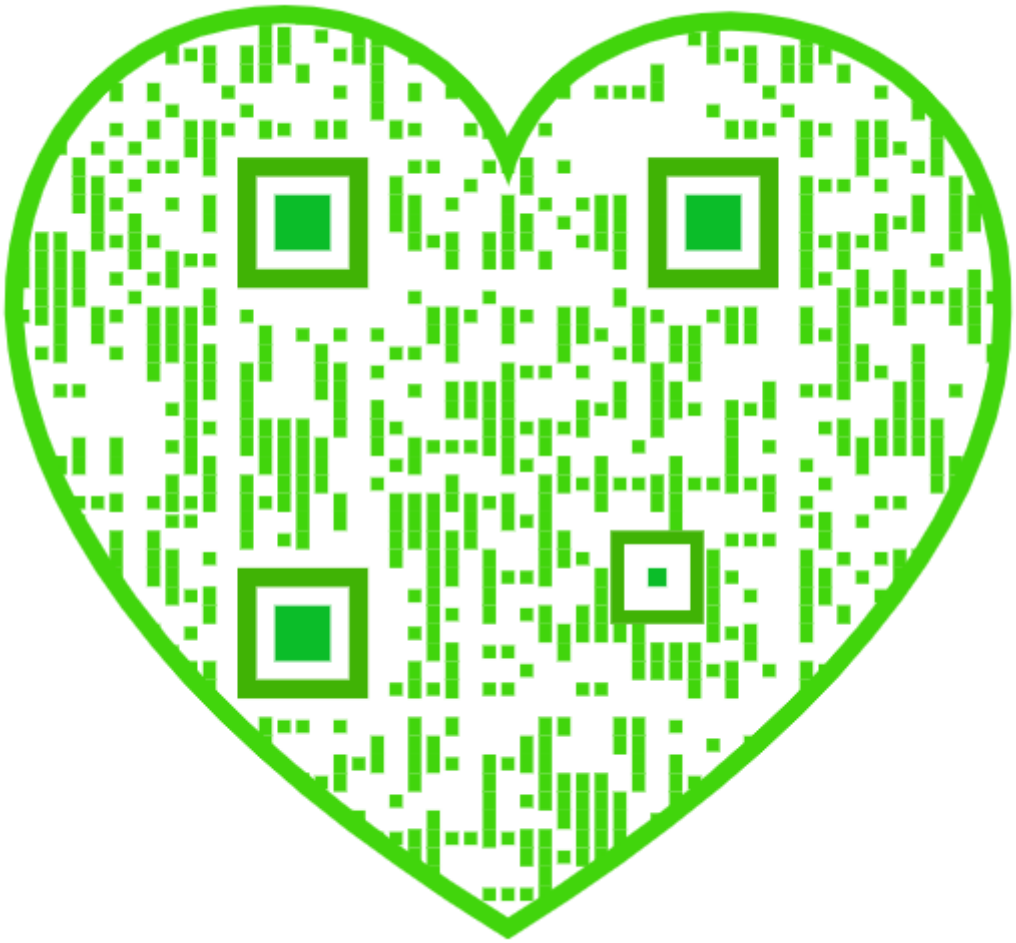

THE FLOW OF WATER THROUGH LONG PIPES.

From the London *Mechanics' Magazine.*

There is no branch of hydraulics with a more direct bearing on the water supply of towns than that which is devoted to the investigation of the phenomena attendng the flow of water through long pipes. For this reason it has for a long time engaged the attention of engineers and physicists. Couplet, member of the Academy of Sciences, appears to have been the first to undertake this kind of research, and he made seven experiments on the water mains of Versailles. These pipes had already been in use many years, and were consequently—through the formation of deposit—in the state of mains after having been for some time in use. Bossut carried out twenty-six experiments on new tin pipes of small diameter,—of about one or two inches; Dubuat made eighteen experiments on tubes of the same material and 0m·071 inches in diameter. On these fifty-one experiments M. de Prony based the deductions that have served as rules for the setting-up of water mains for the supply of towns. The celebrated Professor Weisbach, of Freiberg in Saxony, some ten years ago, also carried out eleven experiments on the resistances experienced by water in its flow through pipes, and taking, besides, into account an experiment by Mr. Gueymard, of Grenoble, in addition to those of De Prony, Weisbach gives a number of formulæ which differ to some extent from those of De Prony.

Water, in its descent through the mains, absorbs by the resistance of the sides a portion of the motive power of the fall. Again, when the water has to be forced through the conduit pipes by means of pumps, this resistance requires additional work, which has to be added to that consumed by gravity. And thus, in establishing engines for the water supply of towns, it is of course necessary to take into account this extra power which has to be given to the prime mover. Every foot of pipe will afford more or less of resistance through friction and adhesion to the motion of the water; every change of direction at a knee or bend will increase this resistance, and will cause a loss of head equal to the height due to the velocity multiplied by a known coefficient. One of the reasons of the loss of *vis viva* in the change of direction undergone by a fluid at a knee or curve is to be found in the centrifugal force which tends to separate the water from the inner side of the pipe, and to thus form a contraction. A whirling motion is also produced at the point of cross section of the two diverging center lines. Any sudden enlargement in the pipe will also cause a diminution of the velocity, and in the same proportion as the area of cross section is increased. When a pipe is narrowed at the inside by the jutting-out of a portion, or by a twist, as is often the case with drawn out pipes, and still more with soldered pipes, this narrowing of the channel will also produce a loss of *vis viva.* It has been found by a great number of experiments, that the frictional resistance is quite independent of the pressure, but that it is directly as the length and inversely as the width of the pipe. It has also been proved that this resistance is greater at higher speeds and smaller at slower speeds, and that it increases very nearly with the square of the speed. Of course, however slow the current may be, all these resistances must make themselves felt to a more or less degree according to the speed, according to the greater or less length of pipe, according to its smaller or greater diameter. Any accidental circumstance, such as the presence of air, or that of any narrowing of the channel, will also considerably increase this resistance. With the fact before us that, however slow the speed, these losses will at once make themselves felt in a long pipe with a narrow diameter, it seems incredible that the motion of a current of water should be employed to give motion to the indicating plungers of hydraulic presses. The losses are independent of the pressure, and being, as we have seen, liable to be increased at a rather quicker rate than the square of the velocity, fluid friction is thus in a direct contrast to the friction of solids. But though the friction of water in a pipe is not increased by pressure, there is every reason for the belief that, at very slow speeds, and with very high pressure, the contraction of the water itself under pressure would come into play and, favored by the presence of what Mr. Grove terms "the irrepressible bubble of gas," compression alone would produce some motion in a pipe with an attendant loss of head. A small diameter of pipe would doubly favor this action. The formulæ of different authors differ very considerably with regard the friction of water in pipes, as well as to other questions in hydraulics. There is more especially one influence on the motion of water in pipes which seems to have been little regarded in England and Germany, at any rate in the books. We allude to the influence of the nature of the surface of the pipe on the motion of the water. The rules generally given suppose that the nature of the surfaces does not influence to any considerable extent the resistance of the sides, and they are based on an expression of this resistance, which contains a factor composed of two proportional terms, the one to the first, the other the second, power of the average velocity of the water in the pipe. But the engineers of waterworks in this country and abroad had long ago noticed that, though the volumes of water delivered by new cast-iron mains for a short time after their erection considerably exceeded the amounts indicated by the formulæ, the case was exactly opposite after the pipes had been in use some time, and the slightest deposit had formed itself in the pipes. It is for these reasons that Mr. Hawksley has long recommended and used the empirical formulæ for the number of gallons delivered per hour: $G = \frac{(15\ D^5)\ H}{L}$

in which L is the length of pipe in yards, H the head of the water in feet, and D the diameter of the pipe in inches. M. d'Aubuisson, well known as the author of a book on hydraulics and the engineer of water-works of Toulouse, also proved that the losses of head caused by the friction of water in mains was sometimes double that indicated by the formulæ of De Prony. D'Aubuisson employed, for calculation of the deliveries of pipes in which the velocity amounted to or exceeded six decimitres, a formula based on the supposition that the resistance was proportional to the square of the speed merely, and this formula gave results rather less, by about a third, than the formulæ of De Prony.

Water is well known not to flow with the same velocity at all the points of one and the same cross section of a pipe. The action of its flow is usually explained by stating that the particles of water flowing in proximity to the sides have a smaller velocity, while the particles at a greater distance have a higher velocity. This effect is produced by the cohesion of the particles of the water to each other, and by their adhesion to the sides of the pipe. Weisbach ingeniously compares a body of water flowing through a pipe with the trunk of a tree. "Just as a stem consists of a number of concentric rings encasing one another, so does the water flowing in a pipe consist of a number of envelopes one over another. The outside ring touches the sides of the pipe, and is in a great measure kept from moving in consequence of the resulting attraction. The other envelopes or layers hang together by means of their natural cohesion, so that one of them cannot advance without affecting the motion of the other." The ring touching the envelope, which is in immediate contact with the sides of the pipe, only moves very slowly; the next inner one moves rather quicker, the third ring still quicker, and so on. The body of water flowing in a pipe thus consists of a number of tubes of water fitting one within the other, all moving at different speeds, and in such wise, that the innermost cylindrical, or prismatic core passes the highest velocity, while the others have less velocity in proportion to their distance from the center, and the nearer they are to the sides of the tube. In consequence, the whole body of water only moves with a velocity which is an average of the speeds of the different cylindrical envelopes. It is, however, more than probable that other and more recondite agencies than ordinary friction and adhesion tend to absorb the *vis viva* of a current—agencies, indeed, that are always more or less present during dynamic phenomena. Alluding to *internal* fluid friction, Dr. Rankine says that, "although the particles of fluids have no transverse elasticity, that is, no tendency to recover a certain figure after having been distorted, it is certain that they resist being made to slide over each other, and that there is a lateral communication of motion amongst them; that is, that there is a tendency of particles which move side by side in parallel lines to assume the same velocity. The laws of this latera communication of motion, or internal friction, of fluids, are not known exactly; but its effects are known thus far:—That the energy due to differences in velocity, which it causes to disappear, is replaced by heat in the proportion of one thermal unit of Fahrenheit's scale of 772 foot-pounds of energy, and that it causes the friction of a stream against its channel to take effect, not merely in retarding the film of fluid which is immediately in contact with the sides of the channel, but in retarding the whole stream, so as to reduce its motion to one approximating to a motion in plane layers perpendicular to the axis of the channel." We quote this interesting passage as an illustration of how intimately the theories of the disappearance of heat during mechancal motion are now being brought to bear on many explanations of mechanical effects, as also as a justification of our belief, which is as yet neither contradicted nor confirmed by experiment, that at a very high prersure the loss of head is no longer independent of the pressure, but that it increases with it.

However this may be, the theory that a current of water in a pipe moves on a system of concentric layers of envelopes is generally adopted, and Weisbach and many other hydraulicians assert that "the speed is not influenced by the nature of the pipe, as the water does not adhere to the pipe, but the liquid particles adhere to each other, and in particular rub against the outside envelope, covering and wetting the sides of the tube." It is thus stated that "if the sides be 'smooth,' there is, *cæteris paribus*, the same resistance whether the pipe consists of brass, glass, or wood. The case," continues Weisbach, "is of course different if the sides be very rough, as, through the irregular prominences and excavations of the rough sides the water is diverted from its straight direction, and is caused to partake of a serpentine or even whirling motion, causing special losses of *vis viva* that materially increase with the degree of roughness or with the number and size of the elevations and depressions." It appears to us that there is an evident contradiction between the two assertions that:—first, if the surface be 'smooth,' it does not matter of what kind it is, whether (say) metal or wood; and, second, that a 'rough surface does cause more or less retardation according to the amount and kind of its roughness. In the first place what is a smooth surface? A smooth surface of wood is, though smooth, quite different from a smooth metallic surface. This is evident to the naked eye, but still more by the aid of a magnifying glass or microscope. The particles of water are so infinitely small that they would search out these crannies, of a nature and amount that differ with almost every different substance, and the motion of the outside ring of water would be affected, though on a smaller scale, as by the rougher surface produced by incrustation, for instance. Again, is it not likely that a material liable to be more or less soaked by capillary attraction, like wood, should probably retard a current of water to a greater extent than (say) glass? Smoothness, is, indeed, merely a relative term. Our remarks appear to give a reasonable explanation of the remarkable results of a great number of experiments made not long ago in France on the influence of the nature of the surface and material of a pipe on the velocity of a current of water, flowing through it. These show that, contrary to received opinions, the nature and the state of the surfaces exercise a very powerful influence on the flow of water through pipes. For instance, iron tarred pipes afford a higher delivery than the results deduced from the formulæ of M. de Prony, and in the ratio of about 4 to 3. Glass gives similar results. Only leaden pipes of diameters of 14, 27, and 41 millimetres gave the result in accordance with the formulæ of M. de Prony. The speed of flow in pipes in which incrustation had but very slightly diminished the diameter was found to be very considerably less than that indicated by the formulæ of De Prony; and only after these pipes were cleaned was there an agreement between De Prony's formulæ and experience. In fact, M. Darcy showed, by a comparison between the values obtained for the numerical coefficients determining the amount of resistance with pipes of the same, or of nearly the same, diameter, that the mere nature of the surfaces, besides their more or less polish, exercises a very considerable influence on the intensity of the resistance

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to the current. He found that, according as the pipes are of wrought iron painted with tar, or of new cast iron, or of cast iron covered with deposit, the coefficient varied in the ratios of about 1 to 1·5 and to 3. The two last figures in the ratio of 1 to 2 justify, as Morin remarks, the practical rule adopted by M. d'Aubuisson for calculating the dimensions of conduit pipes. According to this formula, he allowed for a loss of head double that given by the formula of M. de Prony. This result, which has an important bearing on water supply, "shows that, to be certain of a regular and constant delivery of the mains, it is necessary to suppose them to have got into the state of surfaces covered with deposit, whatever may be the more or less polished substances of which the pipes originally consist. During the first stages in which the pipes are at work, the delivery will be greater than that indicated by the formula employed, but in course of time and usage the delivery will approach it more and more, and the normal delivery will be that which has been thus determined upon beforehand. The smoothness and nature of the surfaces of water mains, and the power required to force the water through them, thus appear to be convertible terms; and if an easy and cheap mode of so forming the surfaces of cast-iron pipes that incrustations would be continually cleared off the surface by means of the current itself, could be devised, the inventor would probably make a fortune, and, what is more, would certainly deserve it.

Mechanical Applications of Gun-cotton.

John Scott Russell, C.E., F.R.S., recently read a paper before the Royal Institution, England, on the subject of gun-cotton; we reproduce the portion relating to the mechanical applications of the substance:—

"The mechanical application of gun-cotton may be considered to be due exclusively to Major-General Lenk, of the Austrian service. Pure gun-cotton becomes either a powerful explosive agent, or a docile performer of mechanical duty, not according to any change in its composition, or variation in its elements or their proportions, but according to the mechanical structure which is given to it, or the mechanical arrangements of which it is made a part. It was General Lenk who discovered that structure was quality, and mechanical arrangement the measure of power, in gun-cotton; and in his hands, a given quantity of the same cotton becomes a mild, harmless, ineffectual firework; a terrible, irresistible, explosive agent; or a pliable, powerful, and obedient workman.

"The first form which General Lenk bestowed on gun-cotton was that of a continuous yarn or spun thread. Gunpowder is carefully made into round grains of a specific size. Gun-cotton is simply a long thread of cotton fiber, systematically spun into a yarn of given weight per yard, of given tension, of given specific weight. A hank of a given length is reeled, just like a hank of cotton yarn to be made into cloth, and in this state gun-cotton yarn is bought and sold like any other article of commerce.

"This cotton yarn converted into gun-cotton may be called, therefore, the raw material of commerce. In this form it is not at all explosive in the common sense of the word. You may set fire to a hank of it, and it will burn rapidly with a large flame; but if you yourself keep out of reach of the flame, and keep other combustibles beyond reach, no harm will happen, and no explosion or concussion will result. If you lay a long thread of it round your garden walk at night, disposing it in a waving line with large balls of gun-cotton thread at intervals, and light one end of the thread, it will form a beautiful firework, the slow lambent flame creeping along with a will-o'-th'-wisp-looking light, only with a measured speed of 6 inches per second, or 30 feet a minute; the wind hastening or retarding it as it blows with or against the line of the thread. This is the best way to commence an acquaintance with this interesting agent.

"Care must be taken not to become too familiar with gun-cotton even in this harmless and playful guise; cotton dresses will readily catch fire from it, and it should not be treated with less care to keep fire from it than gunpowder. In one respect it is less liable to cause danger than gunpowder. Grains of powder are easily dropped through a crevice, and may be sprinkled about in a scarcely noticeable form, but a hank of gun-cotton is a unit, which hangs together and cannot strew itself about by accident.

"The second form of gun-cotton is an arrangement compounded out of the elementary yarn. It resembles the plaited cover of a riding-whip; it is plaited round a core or center, which is hollow. In this form it is match-line, and, although formed merely of the yarn plaited into a round hollow cord, this mechanical arrangement has at once conferred on it the quality of speed. Instead of traveling as before only 6 inches a second, it now travels 6 feet a second.

"The third step in mechanical arrangement is to enclose this cord in a close outer skin or coating, made generally of india-rubber cloth, and in this shape it forms a kind of match-line, that will carry fire at a speed of from 20 to 30 feet per second.

"It is not easy to gather from these changes what is the cause which so completely changes the nature of the raw cotton by mechanical arrangement alone. Why a straight cotton thread should burn with a slow creeping motion when laid out straight, and with a rapid one when wound round in a cord, and again much faster when closed in from the air, is far from obvious at first sight; but the facts being so, deserve mature consideration.

"The cartridge of a common rifle in gun-cotton is nothing more than a piece of match-line in the second form, inclosed in a stout paper tube, to prevent it being rammed down like powder. The ramming down, which is essential to the effective action of gunpowder, is fatal to that of gun-cotton. To get useful work out of a gun-cotton rifle, the shot must on no account be rammed down, but simply transferred to its place. Air left in a gunpowder barrel is often supposed to burst the gun; in a gun-cotton barrel it only mitigates the effect of the charge. The object of inclosing the gun-cotton charge in a hard strong pasteboard cartridge is to keep the cotton from compression and give it room to do its work.

"It is a fourth discovery of General Lenk, that to enable gun-cotton to perform its work in artillery practice, the one thing to be done is to 'give it room.' Don't press it together—don't cram it into small bulk! Give it at least as much room as gunpowder in the gun, even though there be only one-third or one-fourth of the quantity (measured by weight). One pound of gun-cotton will carry a shot as far as 3 or 4 pounds of gunpowder; but that pound should have at least a space of 160 cubic inches in which to work.

"This law rules the practical application of gun-cotton to artillery, A cartridge must not be compact, it must be spread out or expanded to the full room it requires. For this purpose, a hollow space is preserved in the center of the cartridge by some means or other. The best means is to use a hollow thin wooden tube to form a core; this tube should be as long as to leave a sufficient space behind the shot for the gun-cotton. On this long core the simple cotton yarn is wound round like thread on a bobbin, and sufficiently thick to fill the chamber of the gun; indeed, a lady's bobbin of cotton thread is the innocent type of the most destructive power of modern times—only the wood in the bobbin must be small in quantity in proportion to the gun-cotton in charge. There is no other precaution requisite except to close the whole in the usual flannel bag.

"The artillerist who uses gun-cotton has therefore a tolerably simple task to perform if he merely wants gun-cotton to do the duty of gunpowder. He has only to occupy the same space as the gunpowder with one-fourth of the weight of gun-cotton made up in the bobbin as described, and he will fire the same shot at the same speed. This is speaking in a general way, for it may require in some guns as much s one-third of the weight of gunpowder and eleven-tenths the bulk of charge to do the same work; a little experience will set the exact point, and greater experience may enable the gun-cotton to exceed the performance of the gunpowder in every way.

"The fifth principle in the use of gun-cotton is that involved in its application to bursting uses. The miner wants the stratum of coal torn from its bed, or the fragment of ore riven from its lair; the civil engineer wishes to remove a mountain of stone out of the way of a locomotive engine; and the military engineer to drive his way into the fortress of an enemy, or to destroy the obstacles purposely laid in his way. This is a new phase of duty for gun-cotton—it is the work of direct destruction. In artillery you do not want to destroy directly, but indirectly. You don't want to burst your gun, nor even to injure it; and, we have seen, in order to secure this, you have only to give it room.

"The fifth principle, therefore, is, to make it destructive—to cause it to shatter everything to pieces which it touches, and for this purpose you have only to deprive it of room. Give it room, and it is obedient; imprison it, and it rebels. Shut up without room, there is nothing tough enough or strong enough to stand against it.

"To carry this into effect, the densest kind of gun-cotton must be used. It must no longer consist of fine threads or hollow textures wound on roomy cores. All you have to do is to make it dense, solid, hard. Twist it, squeeze it, ram it, compress it; and insert this hard, dense cotton rope or cylinder or cake in a hole in a rock, or the drift of a tunnel, or the bore of a mine; close it up, and it will shatter it to pieces. In a recent experiment, 6 oz. of this material, set to work in a tunnel, not only brought down masses which powder had failed to work, but shook the ground under the feet of the engineers in a way never done by the heaviest charges of powder.

"To make gun-cotton formidable and destructive, squeeze it and close it up; to make it gentle, slow, and manageable, ease it and give it room. To make gunpowder slow and gentle, you do just the contrary; you cake, condense, and harden it to make it slow, safe for guns, and effective.

"To carry out this principle successfully, you have to carry it even to the extreme. Ask gun-cotton to separate a rock already half-separated, it will refuse to comply with your request. Give it a light burden of earth and open rock to lift, it will fail. If you want it to do the work, you must invent a ruse—you must make believe that the work is hard, and it will be done. Invent a difficulty and put it between the cotton and its too easy work, and it will do it. The device is amazingly successful. If the cotton have work to do that is light and easy, you provide it with a strong box, which is hard to burst a box of iron for example; enclose a small charge, that would be harmless, in a little iron box, and then place the box in the hole where formerly the charge exploded harmless, and in the effort it makes to burst that box, the whole of the light work will disappear before it.

"The first trial of English-made gun-cotton was made at Stowmarket in the spring of 1861. A charge of 25 lbs. not only destroyed a tree-stockade, but shattered it into matchwood.

"It is, therefore, the nature of gun-cotton to rise to the occasion and to exert force exactly in proportion to the obstacle it encounters. For destructive shells this quality is of the highest value. You can make your shell so strong that nothing can resist its entrance, and when arrived at its destination no shell can prevent its gun-cotton charge from shivering it to fragments.

"In conclusion, I may be asked to say as a mechanic what I think can be the nature and source of this amazing power of gun-cotton. In reply let me ask, Who shall say what takes place in that pregnant instant of time when a spark of fire enters the charge, and one-hundreth part of a second of time suffices to set millions of material atoms loose from fast ties of former affinity, and leaves them free every one to elect his mate, and uniting in a new bond of affinity, to come out of that chamber a series of newborn substances? Who shall tell me all that happens then? I will not dare to describe the phenomena of that pregnant instant. But I will say this, that it is an instant of intense heat—one of its newborn children is a large volume of steam and water. When that intense heat and that red-hot steam were united in the chamber of that gun and that mine, two powers were met whose union no matter yet contrived has been strong enough to compress and confine. When I say that a gun-cotton gun is a steam-gun, and when I say that at that instant of intense heat the atoms of water and the atoms of fire are in contact atom to atom, it is hard to believe that it shall not give rise to an explosion infinitely stronger than any case of the generation of steam by filtering the heat leisurely through the metal skins of any high-pressure boiler."

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Russian Monitors.

The London *Artizan* of Aug. 1, gives the following description of two iron-clads which are being built in Russia:—

"In the *Artizan* recently we stated that Messrs. Charles Mitchell & Co., iron shipbuilders of Newcastle, had been commissioned by the Russian Government to adapt one of the existing dockyards in St. Petersburg to the purpose of building iron armor-plated vessels of all classes, and that all the heavy machines required for the various operations of iron shipbuilding were manufactured in different parts of England, and were afterwards erected under Messrs. Mitchell's supervision in Russia. On the completion of these erections, this English firm entered into a contract with the Russian Government to construct some of these iron-clads in the St. Petersburg dockyard, and intelligence has been received that the first two ships have been safely launched. The following are particulars of their construction:—The *Ne tron Menya* (*Touch me not*), the larger of the two iron-clads just launched, is 230 feet long, 53 feet broad, and 27 feet deep. She is covered from stem to stern with armor 5½ inches thick at the water-line, and 4½ inches on the remaining surface of the sides, on a backing of teak 12 inches in thickness. The armament will consist of twenty 200-pounder rifled steel guns. The machinery is of 450 horse-power, and in addition there is an auxiliary engine for working large pumps and driving a fan blast to ventilate all parts of the vessel. The draught of water of the *Ne tron Menya*, when fully equipped for service, and with her coals on board, will be 15 feet The launching draught was 9 feet 9 inches, the entire armor being on the sides, with the exception of 25 plates at the bow, and the same number at the stern, which it was thought desirable to fix after the vessel should be afloat. A rifle turret similar to the one built on the *Warrior* is placed on the upper deck, is covered with 4½-inch armor, and is provided with electrical apparatus to convey the captain's instrnctions to the gun-deck, the engine-room, and to the steersman. As the *Ne tron Menya* is destined chiefly for coast defense and for service in the Baltic, she will only be lightly rigged. The second iron-clad, launched together with the *Ne tron Menya*, is a double-turret vessel named the *Smertch* (*Waterspout*), and is about the same size and tunnage as the Danish iron turret ship *Rolf Krake*. The chief dimensions are as follows:—Length 190 feet, breadth 38 feet, and depth 14 feet. The draught of water when in fighting trim will be 10 feet 6 inches, the armor is 4½ inches thick, and extends the entire length of the side, and to a depth of 4 feet below the line of flotation. The armament is carried in two revolving turrets constructed on Captain C. P. Coles' system. These turrets have an internal diameter of 18 feet, and are each capable of carrying two large guns; but being the first turrets on Coles' system made in Russia, it is wished that every facility should be given to insure a successful result, and in this instance but one 300-pounder gun will be placed in each turret. The armor on the turret varies from 6 inches to 4½ inches in thickness. The top of the turrets and the surface of the upper deck are covered with plating one inch thick. The hull is constructed with double bottom and sides, for the purpose of affording safety in the event of the outer shell of the vessel being pierced by a shot, or being run into by an enemy. The space between the outer and inner bottoms is also divided by transverse bulkheads into numerous water-tight compartments, each furnished with pipes for pumping out in case of leakage, or for filling with water to increase the immersion of the vessel, and thereby diminish the surface above water exposed to the enemy's fire. The machinery for the *Smertch* has been manufactured by Messrs. Maudslay, Sons & Field, and is of 200 horse-power nominal, divided into two distinct pairs of engines, 100 horse-power each, for the purpose of driving twin or double screws. The object of such arrangement is to usefully absorb the entire power of the engines, which could not be done so well with one screw on so limited a draught of water, also to give the vessel increased power of maneuvring while in action. For a like purpose a balanced rudder has been fitted in the bow of a vessel. The *Smertch* will be rigged as a three-masted schooner, the fore and mian masts being of iron, and constructed on Captain [redacted]"

The French System of Weights and Measures to be Adopted in England.

A bill has been introduced into the English House of Lords legalizing the use of the metrical system, for all who choose to employ it. On the passage of the bill to a second reading there was an interesting discussion from which we take some extracts:—

"Earl Fortescue, after presenting a petition in favor of this bill from the Associated Chambers of Commerce of the United Kingdom, said the measure had an hereditary claim upon his support, because he whose place he so unworthily filled succeeded in carrying through the other House of Parliament many years ago a measure establishing the system of weights and measures now the law of the land. After twenty years' experience of the working of the present system, however, his late father was so convinced of the superiority of the metric system that he was one of the first to give his adhesion to the introduction, in a permissive shape, of the metrical system in this country. The former act was brought in, in pursuance of the report of a committee, and the present bill was equally the result of the unanimous recommendation of a committee of the other House composed of men of all parties. It was unnecessary to remark that the present, being a permissive bill, must necessarily remain a dead letter unless it was adopted by the free will of those engaged in trade, manufactures, and science. It was not, however, likely that a bill for which the Chamber of Commerce of this country petitioned would remain a dead letter. Their lordships must be fully aware of the variety of the measures of grain, wine, and beer, which prevailed in different parts of the country. The adoption of the metric system would cure this want of uniformity, and would substitute for that which was inconvenient and difficult to learn, a system which was simple and easy to be acquired. The adoption of this system would save half the time which was at present occupied in making calculations. The very strongest evidence had been given in its favor by practical men. Among those who recommended its introduction, and some of whom employed it in the transaction of their own business, were the late Mr. Locke, the engineer; Mr. Wythes (Mr. Brassey's right-hand man); Mr. Whitworth; Mr. Robinson, of the Atlas Works; Mr. Crossley; Mr. Anderson, superintendent of the gun factory at Woolwich; Sir R. Hill; and Professor Graham, the master of the mint. Scientific men were equally favorable to the metric system. The jurors at the International Exhibitions of London and Paris said that a great part of the benefit which might have arisen from the exhibition of the raw produce and manufactures of various countries was lost to thousands of persons in consequence of the difficulty of comparing the weights and measures and the moneys of one country with those of another. Professor Hoffman and Professor Owen, in their reports as jurors of the Exhibition of 1862, referred to the confusion and discordancy which existed in the systems of weights and measures of different countries. The fact was that this confusion was so great, and so much time and labor were consumed in converting the weights and measures of one country into their equivalents in a foreign system, that practically the knowledge of one nation was a sealed book to the scientific men of others. As to the facility with which the system could be learnt there was the most conclusive testimony, and Professor Leone Levi summed up its general result to be that a boy could make the same progress in arithmetic taught according to the metric system in ten months, as would, according to the existing method, take him two years and ten months to accomplish. Considering the value of youthful labor and the short time which could be spared to education by the children of the poor, this was a matter of some importance. He entreated their lordships not to take any step which would impose upon these children two years of useless labor, aud which would prevent the free interchange of the manufactures and commodities as well as of the knowledge and information of all the people of the world. The noble lord concluded by moving that the bill should be read a second time.

"Lord Brougham regarded the bill as a very important step in the right direction. He should like to see the decimal system universally adopted in this country. He was, he might add, an advocate of the change not only in a commercial but in an educational point of view, and he had the testimony of Dr. Chadwick, to whose efforts the half-time system—one of the greatest improvements of our day—was due, to the effect that the introduction of the decimal system would shorten the time occupied in the teaching of arithmetic by one-half.

"Earl Fortescue in reply said, that in all the countries in which the system had been introduced, its simplicity had caused it to work without any friction or opposition.

"The House then divided, the numbers being—

For the second reading	34
Against it	23
Majority	11

"The bill was then read a second time."

Production of Sulphur in Italy.

M. P. Bianchi communicates the following facts to the *Moniteur Scientifique*:—

"The sulphur at present produced in Italy amounts to no less than 300,000 tuns a year, the value of which in the rough state is 30,000,000 francs. This yield, which has increased ten-fold since 1830, is furnished in great part by Sicily. The quantity produced in Romagna, formerly but small, has since increased to 8,000 tuns per annum. During the last ten years great improvements have been introduced in the method of extracting sulphur from its calcareous gangue. It is always obtained by liquefaction by burning a portion of the ore; but this operation, formerly performed in small, open, cylindrical furnaces (*calcarelle*), is now effected by simply heaping the stones and covering them with earth as in charcoal burning. These heaps, called *calcaroni*, are of considerable size, often four hundred times larger than the old furnaces. This new mode of operating has the advantage of diminishing the losses occasioned by the production of sulphurous acid, so that the yield of sulphur is increased by one-fifth; besides sulphur can be burnt in this way near houses and gardens, which, with the old method was out of the question. Formerly it was burnt only at certain periods of the year, now it can be burnt at any time, so that it is no longer necessary to accumulate large quantities of ore. Finally, the operation, which used to be very fatal to the workman, is now almost harmless.

"Sulphur exists in Sicily in a gypseous bed, layers of which extend over a small portion of the island, from Mount Etna to near Trapani. This formation belongs to a geological epoch which has not yet been positively determined. Here, as in Romagna, it contains, besides gypsum, calcaires and clays, more or less marl. In the first case, the sulphur exists in a state of mixture, sometimes uniformly, sometimes irregularly, sometimes in small parallel veins and more rarely in the form of crystals; in the latter case it is not unusual to find it associated with *celestine*, or sulphate of strontium. In clay, on the contrary, it is found in globular masses which is also the case in similar bearings in Continental Italy.

"There are about fifty mines in Sicily, employing 20,000 workmen. The most productive mines are in the provinces of Caltanisetta and Girgenti; ranging next in importance, are those of the provinces of Catana, Palermo and Trapani. The sulphur is extracted in the manner above described by means of *calcaroni;* the loss during the operation amounts to one-third of the ore. Most of the sulphur is exported in the crude state, but little being refined in the island. In this state it is divided into three qualities, the second and third being subdivided into three other qualities. The yield in 1861 was estimated at about 240,000 tuns of commercial sulphur, of which about half was produced by the province of Caltanisetta, a third by Girgenti, 25,000 by Catana, and 20,000 by Palermo; the quantity produced by the province of Trapani is very inconsiderable. Most of the sulphur is exported to France and England."

To Varnish Articles of Iron and Steel.—Dissolve ten parts of clear grains of mastic, five parts of camphor, fifteen parts of sandarach, and five of elemi, in a sufficient quantity of alcohol, and apply this varnish without heat. The articles will not only be preserved from rust, but the varnish will retain its transparency, and the metallic brilliancy of the articles will not be obscured.

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CATALYSIS.

When some managing mamma has succeeded in making a match between one of her daughters and some eligible young man, it is frequently the case that the young people are entirely unconscious of the external influence that has brought about their union. In the world of inanimate matter there are substances which possess a power closely analagous to that of the "match-maker," a power not less subtle, not less mysterious, and more uniformly efficient, than hers. Cold oxygen gas and carbonic oxide may lie in contact for years without combining together, but if a piece of clean platinum is placed in the mixture, the two gases immediately manifest an affection for each other, and enter into combination. The platinum itself undergoes no change, but induces the union of the other two substances by its simple presence. This is catalysis.

If starch is mixed with saliva and kept for a few minutes at a temperature of 100°, it is converted into sugar by a catalytic action of the saliva. It is stated by Dalton and other eminent physiologists that nearly all of the chemical changes which occur in the animal economy are due to this mysterious property.

Casting of a 160-tun Anvil Block.

The Northern and Eastern Counties correspondent of the London *Engineer* thus describes the casting of an anvil block weighing 160 tuns:—

"Another immense casting has been turned out by Messrs. J. M. Stanley & Co., of the Midland Works, Sheffield, viz., a 160-tun anvil block for a steam hammer. The casting-shop in which the monster was brought into shape and form was that in which the previous castings had been made. In the center of the floor a great pit was dug, and in this the mold was formed, the anvil being cast with its face downwards. The mold was 12 feet square at the base, and 11 feet 6 inches deep, and it was estimated that nearly 170 tuns of iron would be required to fill it. At intervals outside the shop were five furnaces, and at six o'clock on Friday morning these commenced to pour their molten contents into the huge chasm, and continued until about five o'clock, when the operation was declared to be successfully completed. The scene in the casting shop was most animated. From four or five different points streams of liquid fire were slowly rolling to the edge of the pit, where they fell amidst showers of starry sparks into the vast mass beneath. The men seemed to be perfectly indifferent to everything but the success of their work; and they charged and emptied the furnaces with admirable regularity until the last tun was run in. A metal rod was thrust through the mass to test its perfect liquidity, and, this having been satisfactorily proved, the top of the pit was carefully closed, to be opened no more until the metal has cooled, which will probably be in about seven weeks. The anvil is intended to be placed in the gun manufactory of Messrs. Firth, which is close to the Midland Works, on the Sheffield side of the second railway bridge. The predecessors of this anvil are fixed in an immense and admirably arranged forge, where seven huge Nasmyth hammers are continually employed in the forging of guns and the great shafts and cranks of marine engines. The "160-tun" will be placed in a forge now building at the corner of the works nearest the railway. The distinguished stranger will be amply provided for, as one of his weight and substance should be. His 'bed' is being prepared by a body of laborers who have been engaged on that duty for months, and as a first step they have formed a first course of great piles, which have been driven by steam power 15 feet into the solid ground. Upon these will be placed a thick bulk of oak, solidly braced and bolted together, and the combined mass will form the bed of the anvil. Only about half a foot of its bulk will appear above ground. The object of having such an enormous casting is, as we have before explained, to secure an anvil that no force can shake. The block will have to sustain the blows of a 25-tun steam hammer (Nasmyth), which will be employed in forging 600-pounder and 300-pounder guns, which Messrs. Firth are making for Mr. Whitworth. In all probability these enormous weapons will form the armament of our fleet and fortifications, and in Messrs. Firth's large and well-ordered forge they may be seen in all stages of manufacture. In this forge were made the wonderful guns now being tried at Shoeburyness, and which have stood the unprecedented test of nearly 3,000 rounds, without giving the slightest sign of failure. We saw on Friday another gun under the hammer, and heard that it was to be 'proved to destruction,' if that result could be obtained by any charge of powder that could be got into the chamber. In the adjoining shop the guns and some great crank-shafts were being bored and turned. The shot and shell factory is in the immediate neighborhood; and there the steel shot and other projectiles are being manufactured for various foreign Governments—America, France, Russia and Spain. Recent experiments have shown that steel shot will penetrate any iron plates yet made, but the British fleet is only supplied with the old cast-iron projectiles."

Obtaining Oxygen Gas.

An invention has been patented by Mr. John Robbins, of Oxford street, London, which relates to improvements in the treatment of certain substances containing oxygen, whereby the gas is separated and evolved therefrom in a simple and economical manner. Various substances may be employed for producing the same results in accordance with the principles of the invention, but according to the method which by preference he employs, he forms a compound by combining peroxide of barium with bichromate of potash, in the proportion of two parts by weight of the former to one part of the latter. The compound is then placed in a glass flask or bottle, or other suitable receptacle, provided with an exit tube; and sulphuric acid, diluted with seven parts of water to one part of acid, is poured upon the compound, in the proportion of eight parts of the dilute acid to one part of the compound. The strength and quality of the dilute acid may be varied according as it is desired that the process shall be performed slowly or with rapidity. The result of this operation will be that oxygen gas will be evolved from the substances thus combined, and which gas may be collected over water or mercury in the ordinary way. In cases, however, in which it is desirable that the oxygen should be obtained with greater rapidity than the method herein described, its evolution may be accelerated by adding a small quantity of hydrochloric acid to the dilute sulphuric acid. Peroxide of barium may be replaced by any other peroxide capable of forming peroxide of hydrogen, as, for example, the peroxides of potassium, sodium, stronta in and calcium, but in consequence of the high price of these substancee they are practically inapplicable, peroxide of barium being the only suitable substance which can be easily and cheaply prepared. Again, instead of the bichromate of potash other combinations of chromic acid, and also manganic acid and permanganic acid, and their compounds, as, for example, manganate or permanganate of potash may be employed, as may also the peroxide or manganese and peroxide of lead, but in practise the bicromate of potash is, so far as his experience will enable him to form an opinion, much to be preferred to any other substance. In lieu of the dilute sulphuric acid, with sometimes a small addition of hydrochloric acid, dilute hydrochloric acid alone, or dilute nitric acid, or any other acid possessing similar or equivalent properties, may be employed; the degree of dilution corresponding with that before directed with regard to sulphuric acid, and a similar or equivalent proportion being added to the compound of peroxide of barium and bicromate of potash. If desired, the acid may be altogether dispensed with, bisulphate of potash being substituted for the same. In this case equal proportions of the mixture of peroxide of barium and bichromate of potash and of the bisulphate of potash should be mixed, about seven or eight parts of water being added to the substances thus combined. Another mode of obtaining oxygen gas is to place the mixture of peroxide of barium and bichromate of potash, or their analogues, in a dry state in a retort or other suitable receptacle, and then to apply heat thereto by any of the known methods suitable for the purpose, when oxygen gas will be given off, and may be collected in the usual manner. The evolution of oxygen from the peroxide of barium alone when heated to redness has been known to chemists for a considerable period, but the process has been practiced in the laboratory as a matter of experiment only, and is wholly inapplicable to the ready production of oxygen for practical purposes. He claims that by his methods oxygen gas can be readily and quickly obtained with the aid of very little apparatus, and that of the simplest character, and the processes can be carried out by persons unused to chemical manipulation with the certainty of successful results.

THE HECKER AND WATERMAN EXPERIMENTS.

The following figures complete our account of the experiments which are already finished.

The series from May 17th to May 27th; without heat in steam jacket.

Pounds of steam evaporated from water at 100° Fah. by 1 pound of coal per tank—

⅞ths cut-off	8·421
⅔ds cut-off	8·778
½ cut-off	9·068
¼th cut-off	8·726

Pounds of steam evaporated from water at 212° by 1 pound of coal—

⅞ths cut-off	9·433
⅔ds cut-off	9·238
½ cut-off	10·598
¼th cut-off	10·460

Pounds of steam evaporated from water at 100° by 1 pound of combustible—weight of ashes deducted—

⅞ths cut-off	10·033
⅔ds cut-off	10·565
½ cut-off	10·533
¼th cut-off	10·181

Pounds of steam evaporated from water at 212° by 1 pound of combustible—

⅞ths cut-off	11·177
⅔ds cut-off	11·840
½ cut-off	12·318
¼th cut-off	12·240

Series tried from May 12th to June 4th; steam in steam jacket.

Pounds of steam evaporated from water at 100° by 1 pound of coal—

⅞ths cut-off	9·183
⅔ds cut-off	9·148
½ cut-off	8·992
¼th cut-off	8·859

Pounds of steam evaporated from water at 212° by 1 pound of coal—

⅞ths cut-off	10·225
⅔ds cut-off	10·274
½ cut-off	10·013
¼th cut-off	10·140

Pounds of steam evaporated from water at 100° by 1 pound of combustible—

⅞ths cut-off	10·686
⅔ds cut-off	10·497
½ cut-off	10·392
¼th cut-off	10 021

Pounds of steam evaporated from water at 212° by 1 pound of combustible—

⅞ths cut-off	11·898
⅔ds cut-off	11·737
½ cut-off	11·571
¼th cut-off	11·467

Series from April 1st to April 26th; the engine worked as a non-condenser, steam in steam jacket.

Pounds of steam evaporated from water at 100° by 1 pound of coal—

⅞ths cut-off	9·349
⅔ds cut-off	8·887
½ cut-off	8·055
¼th cut-off	8·726

Pounds of steam evaporated from water at 212° by pound of coal—

⅞ths cut-off	10·411
⅔ds cut-off	9·896
½ cut-off	9·820
¼ths cut-off	9·744

Pounds of steam evaporated from water at 100° by 1 pound of combustible—

⅞ths cut-off	10·862
⅔ds cut-off	10·339
½ cut-off	9·355
¼th cut-off	10·258

Pounds of steam evaporated from water at 212° by 1 pound of combustible—

⅞ths cut-off	12·095
⅔ds cut-off	11·513
½ cut off	11·406
¼th cut-off	11·422

JAPANNING OLD TEA-TRAYS.—First clean them thoroughly with soap and water and a little rotten stone; then dry them by wiping and exposure at the fire. Now, get some good copal varnish, mix with it some bronze powder, and apply with a brush to the denuded parts. After which, set the tea-tray in an oven at a heat of 212 or 300 degrees until the varnish is dry. Two coats will make it equal to new.

A new and magnificent gymnasium and laboratory is now in course of erection as an adjunct to Amherst College, Mass. This splendid addition is the result of a princely gift to the College of fifty thousand doilars, by John Z. Goodrich, of Stockbridge, Mass., U. S. Collector at Boston.

ISOMERIC OILS.—Oil of lemons and oil of turpentine are composed of the same elements in the same proportions; an atom of either being formed by the combination of 5 atoms of carbon and 4 of hydrogen.

VELOCITY OF MECHANISM.—A 60-inch fan running 4,000 revolutions a minute, has a velocity at the periphery of 1,100 feet per second. This is just about the average velocity of cannon balls.

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Correspondence

Twin Screws.

MESSRS. EDITORS:—The subject of twin screws, or two screws, one under each quarter, is being agitated in England as though it was new, when in this country it was the first method tried, particularly upon the northern lakes; all the first propellers there having them.

During the winter of 1842-3 I built a propeller of some 300 tuns, and, as usual at that time, the power was relatively small. Her speed did not meet my expectations. However, I thought I would give what was then a comparatively new mode of propulsion a fair trial, therefore I let her work two seasons without material change, but, during the winter of 1844-5, I took the two screws from where they were and put one of them, without any alteration of it, upon a shaft running through the stern post, extending the keel by means of an iron shoe, connecting with an iron supplemental sternpost, to which an iron rudder was hung. Both engines were attached to the same crank pin, they standing at an angle of 90 degrees with each other, the boiler being left as it was, thus making the first single wheel propeller upon the Upper Lakes. The result of which, I found to be a very large increase in speed.

The season following, a new propeller was built, with the same general arrangement, and from that time the single wheel rapidly gained favor, until now, it is very rare that any vessel having more is built, and then only for special purposes; such as for short trips, where there is much going in and out of narrow and crowded harbors, or for shoal water, where but little immersion can be had. In fact, for two-thirds to three-fourths of the diameter of the single wheel is considered sufficient immersion when the vessel is light.

Experience there has demonstrated the following facts, viz:

That, while a vessel with a single wheel is stronger and lighter, she costs considerable less than one having two wheels, and more speed from a given boiler power is attained, current repairs and running expenses being materially reduced.

The shaft can be more firmly supported, and it is not so liable to derangement as are *two*, one from each side; and the liability of breaking or fouling *one* of *two*, is, on account of their position, more than four-fold that of breaking or fouling a single one.

With two, there is the advantage of more perfect control in entering a crowded harbor, and also, that of having one engine or wheel to work with, should the other be broken; but, commercially, these are very small, although for naval purposes they may be of more importance. Yet, I think for such their importance may be over estimated.

Suppose, in case of battle, spars and rigging are shot away, falling overboard, they would almost assuredly be picked up by the wheel under the counter, and, of course, it would be disabled; thus, rendering the ship unmanageable; for, with one wheel foul and dragging, the ship could not be steered at all.

True, wheels may be caged or guarded so as to prevent *ropes* from being picked up by them; but, such cages would be cumbrous, and an impediment to the speed of the ship; while, if the end of a spar or a piece of drift wood should enter one of them, very bad work might be made with both wheel and cage, and perhaps the bracket supporting the end of the shaft would become deranged.

Therefore, I question very much whether the increased weight of the vessel and machinery, the greater quantity of coal to be carried to perform a voyage, and the increased liability to derangement, will not materially outweigh any advantages which two wheels can afford a naval vessel, even with twin keels, as proposed in England. B.

N. B.—The particular vessel referred to, was the *Independence*, which, in the fall of 1845, I hauled on ways, from the river below the rapids at "Sault St. Marie," a distance of 4,400 feet, to a point about 30 feet higher than where I took her from, and from which I launched her into the river above, thus placing the first steam power upon Lake Superior.

Chicago, August, 1864. R. C. B.

Massie's Rotary Engine.

MESSRS. EDITORS:—In the description given of Massie's Rotary Engine, on page 97, Vol. XI. No. 7 (new series), SCIENTIFIC AMERICAN, it is stated:—"The fly-wheel, C, carries the piston past the abutments at the time when it receives no steam." As this statement conveys the idea that there is a "dead center" in this engine, I should feel obliged if you would remove this impression by the following statement:—What is represented as a fly-wheel is intended as a "band wheel" to communicate motion to machinery. On referring to Fig. 2 of the above-mentioned description, it will be observed that the piston, E, is represented as passing one of the abutments, in which position the piston is under full pressure of steam. The whole area of the piston is always exposed to steam, but when the end of the piston is passing between the ports (which is a momentary period of a revolution, and being the time the steam is cut off by valve, I), the steam is acting expansively only on the whole area of the piston in the chamber, D, and as the steam cannot escape from this part of the cylinder till the piston has passed the ports; the engine cannot be stopped in that position, that is, when the steam is cut off by valve, I, so that there is no "dead center" requiring a fly-wheel. T. G. MASSIE.

Port Henry, Aug. 13, 1864.

[Mr. Massie's engine was described from his specification, but we cheerfully make the correction he desires.—EDS.

Who cast the Screws for the Italian Frigates?

MESSRS. EDITORS:—Would you oblige a constant reader of your journal by stating the names of the workmen-molders who prepared and cast two propeller wheels—one for the Italian iron-clad frigate, and the other for the Russian Government? There is a pompous fellow here, who is constantly boasting that he cast them, and I know for a fact he is an incompetent man and a poor tool. MACHINIST.

Titusville, Pa., Aug. 14, 1864.

[The name of the foreman molder who prepared and cast the propeller wheel of the *Re d'Italia* is Mr. John Ogden, of the Novelty Iron Works; no other person engaged in molding the wheel is now in Titusville, Pa. Mr. Samuel Gelston, of the Morgan Works, is the name of the foreman who cast the other wheel, for the *Re don Luigi Di Portugallo*; and Mr. William Gaynor, foreman of the Etna Iron Works foundry, cast the screw for the *Dunderberg*. We know of no wheel cast for the Russian Government. Our pompous friend probably assisted to the extent of making the core for the hub.—EDS.

Chilled Shot.

MESSRS. EDITORS:—In the SCIENTIFIC AMERICAN of Aug. 6, I read that Capt. Palliser, of the 18th Hussars, England, has produced a strong and exceedingly cheap shot by casting it in an iron mold. I take this opportunity to inform you that I received a patent, Jan. 6, 1863, from the Patent Office, Washington, for the same process. WM. BOEKEL.

Philadelphia, Aug. 23, 1864.

Rhetoric.

When a man talks about something he does not understand, he is certain to show his ignorance. "A Veteran Observer" in the Daily *Times* thus commits himself in regard to to the monitors:—

"The naval operations at Mobile show that the splendid performance of the fleet there was due much more to the genius of Farragut, than to any amount of iron or monitors. He passed Fort Morgan close by, pouring his heavy broadsides into the very embrasures of the enemy, and long as the ocean tides shall roll, the makers of the monitors may be assured that seamenship is the first thing in a navy—worth all the iron in the world. Just see how beautifully Farragut maneuvered! Himself standing at the main-top head, and utterly disregarding the boasted power of the great rebel ram, he sailed into the iron-clad, and poured in such broadsides as filled her with streams of running blood. Of what use are these heavy iron monitors, when fast-going ships can go round them, choose their position, and pour in a broadside of thousands of pounds?"

This would be a very telling paragraph if it were only true. Farragut's broadsides into the rebel ram went up into the air, and did not shed as much blood as a musketo can draw. With his fast ship he went round the heavy iron-clad, while she stood still; *his* scuppers ran blood, not the enemy's; and but for the monitors, the "Observer's" paragraph would have had a different peroration.

Oil Refining.

Several oils from the mode of their extraction, are necessarily impure, and various means are taken for refining or purifying them; thus the so-called fish oils; that is, whale, seal, cod, &c., are clarified either by mixing them with a chemical solution, or by passing steam through them, and filtering through coarse charcoal. The chemical solutions employed are various. One method is, to use a strong solution of oak bark, the tannic acid in which combines with the aluminous matters present in the oil, and precipitates them. Another plan is, to agitate bleaching-powder, formed into a milk with water, with the oil, and then, after subsidence of the chloride of lime and water, to wash the oil with water, or jets of steam passed through it. A more simple and very effective plan is, to apply a steam heat not exceeding 200 degrees Fah., and then pass a current of air of the same temperature through it continuously for some time; this effectually bleaches the oil.

Olive and some other vegetable oils are refined by agitating them with a saturated solution of caustic soda. This renders the whole soapy; but after a time the oil precipitates a saponaceous deposit, and the remainder becomes quite clear and pure, and is then poured off. The value of several of the most important oils of commerce is so greatly increased by refining, that this art has now become a very important branch of business, and is carried out on a large scale.

BISULPHIDE OF CARBON.—The *Journal of the Society of Arts* (London) says that "M. Deiss, one of the largest manufacturers of bisulphide of carbon in France, has invented an apparatus containing hydrate of lime, which absorbs the waste sulphureted hydrogen given off during the process. At the suggestion of M. Payen, M. Deiss has substituted for the lime sesquioxide of iron mixed with sawdust. The products resulting are water and sulphur, the latter being recovered by simple washing with bisulphide of carbon, and subsequent distillation. The oxide of iron is then calcined, and is once more ready for use. The idea has, of course, been taken from the method of gas purification now adopted by many companies, but the application is new."

THE LAIRD RAMS.—The *Mechanics' Magazine* says that *El Tousson* and *El Monnassir*, iron-clad rams recently purchased by the Government, have been handed over to Messrs. Laird Brothers, by Captain Paynter, of her Majesty's ship *Majestic*, the builders having contracted with the Admiralty to complete them for sea. The vessels will be renamed respectively the *Scorpion* and the *Wyvern*. They are each to be armed with four 300-pr. guns, or a broadside of 1,200 pounds. The turrets are on Captain Coles's cupola principle. The *Scorpion* will probably be ready in a few weeks, if the damage she has suffered from being exposed in an incomplete state to the winter weather is not found to be very serious.

INTERESTING TO MATCH MANUFACTURERS.—It has been decided that, under the new law, each "block or box" of matches sold after the first day of September next, requires a stamp in accordance with the number of matches it contains; and the stamp duty cannot be paid by placing the appropriate amount of stamps upon the whole package of "blocks or boxes," for the reason that every block or box sold must have the stamp or stamps upon it.

RHODE ISLAND coal is now successfully used, in part with Pennsylvania anthracite, in the melting of copper metal and iron pig metal, and wholly in the generating of steam, at the Sochanosset Facing Company's Works, in Cranston. In the melting of iron it makes high iron soft—in other words, converts No. 3 iron back to No. 1 iron.

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THE REBEL RAM "TENNESSEE."

The fololwing interesting account of this vessel is cut from the *Tribune* correspondence, and is doubtle ss correct, except in the impression it leaves on the reader—this is, that the iron-clad was captured by *wooden vessels.*

"The rebel ram *Tennessee*, in the extraordinary fight with nearly half our entire fleet, which took place inside the harbor, proved herself one of the most formidable crafts for harbor defense which has ever been constructed, and an inspection of her which I have been permitted to make, shows with what justice the Rebel Admiral Buchanan claimed that she was able to sink an entire fleet. Her hull was originally intended for a man-of-war, and is put together in the most staunch and substantial manner in which it is possible to build a vessel. Her length is about a hundred and eighty feet. In form she varies from the old *Merrimac*, though evidently a modification of that unfortunate and shortlived craft. Her armor consists of two-and-a-half.inch iron in bars eight inches wide crossing each other and bolted down with one-and-three-quarter-inch bolts, making five inches of solid iron. This again is backed by two feet of solid oak through the entire portion of the boat above the water line, and extending some feet even below that. From her forward casemates forward, including her pilot house, an additional inch of iron is given her, making six inches of plating, and an additional foot, making three feet of wooden backing at this part of the boat.

"Her gun-room, if that is the proper term to use, occupies about two-thirds of her length, and is constructed with a flat top, composed of two-and-a-half by eight-inch iron bars, crossed and bolted together, forming a close lattice work above her gunners, and affording ventilation while in action. The sides are inclined like those of the old *Merrimac*, and as before stated are composed of five inches of iron plating, backed with two feet of solid oak backing, through which, in the fight with our fleet, no ball succeeded in piercing. Her ports, of which there are two on either side, and one fore and aft, are closed by means of iron shutters, which revolve upon a pivot in the center of one side, and are worked by means of a cog wheel on the inside in a very simple and expeditious manner. They are liable, however to derangement, and in the engagement with our fleet two were actually so deranged as to prevent their being opened, while a third, the after one, was shot away entirely, the pivot on which it revolved being broken off, and it was through this that the fragment of shell entered which wounded the rebel admiral, as he was standing near, directing a gunner to clear away some splinters with which it had become filled.

"It is a curious and interesting proof of the excellence of our gunners, that some ten shots struck in close contiguity to this port which it was early discovered it was impossible for her crew to close, and in fact this really became the heel of Achilles to the fated *Tennessee*. Somewhere between forty and fifty shots struck her during the fight in nearly every part of the boat, but not one penetrated her impervious armor. One fifteen-inch shell from the monitor, *Manhattan*, as is supposed, made a deep indentation which must have caused her to stagger, but bounded off from her ribs of steel. The impaction of the blow, however, stove through her two feet of wooden blocking, and produced inside all the evidences of the missiles having come through. The splinters flew promiscuously in all directions in the neighborhood, inside. The ram is armed with two seven and an eighth-inch rifled guns of the Brooks pattern, fore and aft, and with four of the same six-inch guns in her broadsides.

These effective weapons have been turned since her capture towards Fort Morgan, and will doubtless, as old friends, be highly appreciated in the fort by her garrison. Some eighty superior muskets were also captured along with the ram in complete order. Nothing, in fact, which could render her more complete in her appointments in any respect was spared by Admiral Buchanan in fitting her out; and as she has been some two years building, she was about as thoroughly appointed as it was possible for her to be. In addition to her armament described, she was armed with a formidable iron prow for ramming, wich made her in that particular in no wise inferior tothh *Merrimac*, whose exploits in that line must be fresh in the minds of the reading public still. One point of weakness with her was her rudder chains, which were on her deck, and covered only with a half-inch of iron, and were soon deranged, rendering her, but for an additional provision of ropes and blocks, entirely unmanageable. As it was, the rope substitute was the means by which her rudder was managed durlng the engagement.

"The shooting away of her smoke stack has been by some giveu as the cause of her surrender. Nothing can be more absurd. The effect of the loss of this could do nothing more than to lessen her draft slightly, as it was only shot away above her upper deck—on a level with which it rested; of course it could in no manner have any thing to do with causing the ram's surrender. That fortuitous event was the immediate result of the wounding of her brave, though misguided commander, the terrible hammering at her by our fleet from every side, the derangement of her ports and consequent uselessness of three of her guns, and the severing of her rudder chains, rendering her to a great extent unmanageable.

"She is, however, by no means swift, as it is, though capable of making greater speed than first stated. It is claimed that she can make seven knots, which is without doubt above her capacity. Her draught is about fourteen feet, possibly fourteen feet six inches. Her condition at present is such, that in spite all the cannonading she has received, in spite of the ramming she has undergone, in spite of her lost smokestack and her broken rudder chains, she can be effectually turned against Fort Morgan to-morrow, and with a little repairing, which can be given her, as she lies, in a few days' time here, she can be turned towards Mobile and made, if the new channel permits her to get there, a most formidable antagonist against those who built her.

"I do not wish to be understood as saying that the *Tennessee* presents no evidence of the struggle in which she has been engaged, for most assuredly and unmistakably she does. Her iron armor all over shows the deep indentations where our balls have struck her. Her iron plates are, many of them, bent and warped by the tremendous blows which she has received, while many of her iron plates have been torn away and displaced by the action of the shots she received.

"*But for all this, the ramming she received from the staunch old Hartford, the Ossipee, the Lackawanna, and Monongahela, who severally tried to run her down, have caused no seam to open in her unyielding hull, and she is to-day just as seaworthy as before the fight, and when some of her scars shall have been healed she will do just as effective service for us in repelling foreign foes as she did against us in the hands of domestic ones.*"

"The unprejudiced reader will see how carefully this correspondent avoids mentioning the part the monitors took in the action, and only contemptuously alludes to one—the *Manhattan*. He commits himself, however, in the last paragraph, and says all the ramming that the rebel vessel received did not hurt her, but he leaves us in ignorance of the fact—that the monitors were the efficient ships, and but for their presence not one of our wooden fleet would have been left to tell the tale of disaster.

"When the first monitor acquired her success the daily papers were exultant, but now, when they have gained a far greater victory thay are not only silent, but endeavor to give the credit to others. An honorable course, truly.

A Linguistical Raid in Mobile Bay.

A somewhat hyperbolical individual, who signs himself Henry St. Paul, having stood upon the ramparts of Fort Morgan, an eye-witness to Admiral Farragut's brilliant victory in Mobile Bay, writes to the Mobile *Tribune* a long account of what he saw, which strikes us as the most curious exhibition of modern bathos that we remember ever to have seen in print. We make room for the following elegant specimen of Mr. St. Paul's narrative:—

But hark! a potent voice yet unheard, is now adding its grave and ominous sound to the awful concert. It is the *Tennessee*. It is the hero of the *Merrimac*. It is the Nestor of modern days, the intrepid Buchanan, who now lets loose on the enemy the direful dogs of war. All seems hushed into that awful sound that rings in our ears as the precursor and harbinger of a change of fortune. It is the gray-haired veteran, who standing alone on the deck of the *Merrimac*, sunk the whole of the boasted Federal fleet at Fortress Monroe, and who made them pay dearly for the honor to have once counted him among their bravest commanders. There again he confronts them, as each passes, and fearful of his blows gives him a wide berth to the eastward, he pours into them his steady and regular fire; first the monitors, shying off to the west at least 1,200 yards, then the cautious *Brooklyn*, and *Hartford*, then the whole fleet running past him, in terror as much of his name as his deeds. One, two, three, then six, then ten, then twelve, seventeen pass him afar off, and seventeen receive his salute; and then, with the wings that fear lends to the pale-face and poltroon, they rush down toward the western shore, far beyond his range. Of those who lag behind, two engage the *Selma*, each of which could haul her upon her deck as a fancy jolly boat; three make for the *Gaines*, which, in still greater disproportion, rushes in their midst, and boldly attempts to grapple the most powerful of her adversaries. Foiled in this fool-hardy enterp ise, receiving in a few minutes fifteen shots through her hull and machinery, crippled and almost sinking, she appears, under the vivifying touch of the gallant Bennett to recover one moment the spasmodic energics of a dying man; extricating herself by a supreme effort from the grasp of her powerful enemy, she frantically rushed toward the shore, where, as she beaches high and dry on the solid sand, her whole frame shattered and exhausted by the effort, renders a low rumbling sound, as the death rattle of a giant.

But yonder, yonder, near the western shore, the *Selma* raked fore and aft by the broadsides of her antagonists, is swept by their shot, and her decks covered with dead and dying. She strikes that flag which she so vallantly defended. Thus, the gallant Pat Murphy falls into the hands of the enemy, who triumphantly raise their infamous stars and stripes over the immaculate standard of the South.

And now all anxious eyes are turned towards the *Tennessee*. which, still in the midst of the channel, seems proudly and defiantly to expect the combi ed efforts of the seventeen heavy crafts now hovering on her flanks and rear; but she soon realizes the fact that they are afraid of her, even in the proportion of seventeen to one. They intend to drive her under the cannons of the fort, and leave her there until eaten up by the worms; starved out of coal and provisions, she will fall an easy prey into their hands.

When the noble ship, like a thing of life, ceased to awake from a deep slumber, and her whole frame, shaking with anger, vibrates through the iron nostrils of her powerful machinery, she emits a hissing sound, as the explosion of her long restrained fury; and suddenly wheeling round, she darts with her utmost speed after the miscreants. As she steams up westward, in quest of the arrant crew, her broad plumes of black smoke and snow-white steam rolling back in heavy clouds in her wake, her pointed ram cleaving the waves in twain, she realizes the very image of courage and power combined, and appears to our eyes like the leviathan of Biblical mythology. On she rushes, and she nears the western shore, the enemy's fleet scatters in every direction—four towards town, and eleven, with the two monitors, north and south of her. Still she keeps on her frantic race, driving them before her, when, sooner than be beached, they finally turn and accept the challenge. There, in the midst of thirteen vessels, two of which more powerful than herself, with eight guns against 200, she engages the fight, gives the first signal, and makes the first charge.

Thus, like an infuriated bear worried by a pack of hounds, she now rushes and tears up one, rips another open, knocks down and smashes a third under his powerful claws, then falls back to take a fresh spring, and makes for the vital part of the yelping curs. Thus brave Buchanan darts right and left, forward and rear, at each vessel in turn, and though his speed is not equal to the promptness of his lion heart, yet each time he rushes towards one of them, the latter hastily backs beyond his reach.

At last getting courage, they form around him, at more than a mile distant, a complete semi-circle, the *Tennessee* in the center; and concentrating their fire upon her, laid broadside after broadside into her flanks. Yet she moves not, but gives back shot for shot, blow for blow, steel for steel, emitting fire at once from each of her port-holes, so severely punching three of her nearest adversaries as to compel them to draw back and careen over on shore. She keeps up the unequal contest in spite of the fearful odds against her.

As the conflict was waxing warmer, anxious groups were formed on the ramparts of the forts, watching in breathless silence the progress of that unparalleled engagement. The fort has long since ceased firing, except when a contemptible Federal craft, formerly the *Buchend*, I believe, thinking, no doubt, that the entrance was free to all, came up braggingly to seek admittance, and being turned over to the brave sergeant, he, with a contemptuous smile, sent through her a heavy "Brooks," which soon settled her account, when the Morgan detailed a party of men to go and burn her up, the crew having taken to their boats and escaped.

In the midst of the group stood our General, who alone had a spy-glass, and in whose intelligent and impressible features we were reading the progress of the fight far better than with the naked eyes. Suddenly he drops the glass from his eye, raises it again, and in a low voice mutters to himself: "She has ceased firing."

And true it was, the noble ship had struck her colors, not that she was tired, not that she was conquered, but, as we learned soon afterwards, because her rudder chains had parted, and she had become the inert and unmanageable mass, unable any longer to confront the foe, or turn upon the base vultures who had stood far off from her, gathered around like all beasts of prey which come to the carrion but run from the living flesh, and the *Tennessee* was lost to our view.

We shall be curious to know when Fort Morgan is taken, whether St. Paul survived this effusion or not. It must have given him a hard one.

A CROSSED belt will drive more than a straight belt, because it hugs the pulley tighter.

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Improved Vegetable Slicer.

Preparing cucumbers for the table, or other vegetables that require to be sliced, is a tedious and unsatisfactory operation when performed by hand. In hotels and boarding houses, or large private families, it takes a great deal of time to do the work nicely, and the appearance of the vegetables named is very often injured by cutting them in clumps rather than in thin delicate slices. The thickness of the slice can be graduated to suit all palates, and pieces of cucumber thin and transparent as tissue paper, or slices of beet a quarter of an inch thick can be made with equal facility. Larger machines can be had for the purpose of cutting cabbage, dried beef, etc.

The trouble with ordinary vegetable slicers is that the knife is often made of poor steel, is immovable, and in a short time gets so black and dull from the action of acids that it gives a bad taste to the vegetables, and cuts poorly, or rather hacks them without cutting. Another fault is in the board the knife is set in; this gets split and warped, and cannot be cleaned thoroughly. This vegetable slicer is a decided improvement upon the old-fashioned utensil. It is made of cast-iron, handsomely glazed with porcelain, so that no acids affect it, and it can be easily cleaned after use. The knife is an ordinary case knife, which can also be cleaned and sharpened by any servant. The cleaning is most essential, for no tidy housekeeper would cut vegetables with a stained knife, as it imparts what is termed "a knify taste," which is very unpleasant. The thickness of the slice is graduated by the small screws A, one at the top and bottom, and one at each side. This invention is one of real merit, for it is useful and ornamental, and very much lessons one branch of the labor of housekeeping. It is the invention of Bernard Morahan, a young inventor, who has during the past few years originated many labor-saving devices of one kind and another. He desires to put this into every family in the land. The inventor will sell the entire or any part of the patent, as he has other business to attend to.

A patent is ordered to issue through the Scientific American Patent Agency, to Bernard Morahan, of Brooklyn, N. Y. For further information address the inventor, at Messrs. Tefft, Griswold and Kellogg, corner Duane and Church streets, New-York.

MORAHAN'S VEGETABLE SLICER.

The First Newspaper.

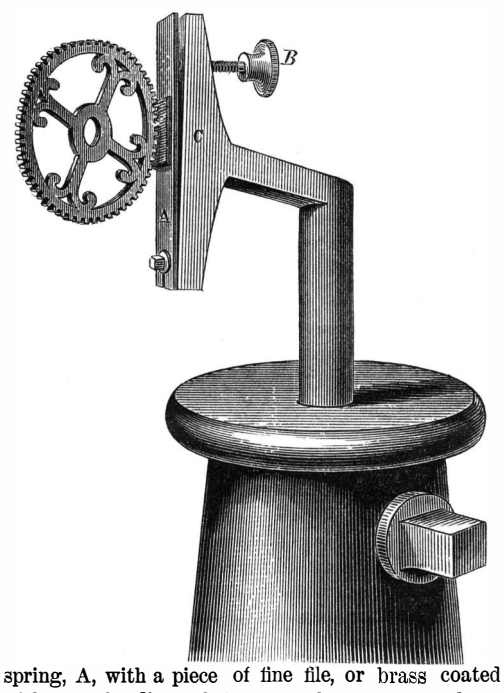
Several contradictory statements have been made in regard to the commencement of journalism. The able and learned Agnes Strickland, in her life of Queen Elizabeth, says that the first genuine newspaper was *The English Mercurie*, which was issued by the Government during the progress of the Spanish Armada, to prevent the circulation of false reports. This paper was printed by Christopher Barker, the Queen's printer, and the first number was dated July 23d, 1588.

The "Invincible Armada" was fitted out by Philip II., King of Spain, and when it entered the English Channel, consisted of 150 ships. It was attacked by the English fleet of 80 ships, and the battle lasted 16 days, resulting in the defeat of the Spanish fleet. A terrible storm completed the destruction of the Armada.

RATTLESNAKE LEATHER.—The editor of the Hartford (Conn.) *Press* has been shown a new kind of leather, made from rattlesnakes' skins, sent from California. The skins have been tanned, and are easily torn, and are only valuable on account of their novelty.

TWAMBLEY'S LATHE REST.

This invention is intended for turning up the teeth of watch wheels. It consists in facing a steel



spring, A, with a piece of fine file, or brass coated with any abrading substance, such as emery or glass; in this way it can be used on steel wheels. This spring is confined at the bottom by a small screw, while the upper end is free. The thumb-screw, B, works against the spring and feeds it up to the wheel, so that it just touches it. By this operation the high parts are cut down and the whole wheel rendered a true circle. The standard C, the spring is secured to, is brass and fits in the post of the lathe. This little attachment saves a great deal of time, and is much better than turning in the ordinary way, as no burrs are left on the teeth, neither do they catch on the tool and break. It was patented on March 15th, 1864. The patent is assigned to Charles A. Shaw, of Biddeford, Maine, of whom all further information can be obtained.

Work and Wages in Europe.

The Secretary of the Board of Agriculture collected, during a recent visit to Europe, some interesting particulars in regard to the wages of farm laborers and others in England, Ireland, and on the continent. 37 cents per day he reports as the highest sum paid; the laborer boarding himself. In some parts of Ireland the farm laborer gets but 25 cents per day, and boards and lodges himself—and at that rate he cannot get work half the time. The "day's work," moreover, is from daylight till dark, no ten hour system or act protecting the workman on the land.

In Ghent, Belgium, the average price is about a franc and a half, or about 30 cents a day, the workmen finding themselves. In the neighborhood of Bonn, on the Rhine, it is about ten silver groschen, or about 25 cents per day. In Wiesbaden it is from 42 to 48 kreutzers a day for workmen on farms and on roads, or from 30 to 35 cents. At the farm of the Agricultural Institute at Geisburg, near Wiesbaden, the price paid is 36 kreutzers a day, or 24 cents; the men in all cases boarding themselves. In and about Heidelberg, in the Grand Duchy of Baden, it varies from 42 to 48 kreutzers. In and around Cassel the daily wages amount to 15 silver groschen, or 37 cents. At the Agricultural College at Weinhenstepen the pay for female laborers in the field is 24 kreutzers, or about 18 cents a day, finding themselves. This is in harvest time, when the price is higher than at other seasons.

"These prices everywhere seemed small for hard, earnest labor, and I could not help thinking how glad our own farmers would be to give double, and board their workmen at that. Now, it is true that the price of living is not generally quite so high in the countries I have named as with us, yet the difference is nowhere so great, comparatively, as the prices paid for labor. In fact, to live as well as our people of the same class do, the cost would be very nearly the same. The price of potatoes, for instance, in the neighborhood of Dublin is 7 pence a stone of 14 pounds. This is a cent a pound, or 60 cents a bushel. Parsnips are £4, or about $20 a tun. The price of good butter throughout Ireland is on an average a shilling a pound, so that a man has to work hard twelve or fourteen hours to earn a pound of butter. This is is the price in town and country. The model farm at Glasnevin got 18 pence or 36 cents a pound in January of this year, 1864, and the lowest price at any time is a shilling or 13 pence—that is 24 and 26 cents. I made similar inquiries as to the price of common articles as a means of comparison everywhere I went, and I know about how the case stands, for I made it a practice to record such items on the spot. The price of flour is about as high on the continent as with us, and I think the same quality of meats about as high."

THE PEACH CROP.—The quantity of peaches brought last week from Delaware to this city, over the Philadelphia, Wilmington and Baltimore Railroad, amounted to 35,000 baskets daily.

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THE "MONITOR" TRIUMPH IN MOBILE BAY.

The recent naval engagement at Mobile Bay is a convincing proof of the views we have always expressed regarding the invulnerability and utility of the monitors. From the published account it appears that Admiral Farragut, recognizes their value; he sent one of them forward—the *Tecumseh*—and had others of the iron-clad fleet in his squadron. The rebel ram, *Tennessee*, was disabled only after a long fight, during which the wooden vessels were of no value whatever. The *Hartford*, in particular, was riddled by broadsides from the *Tennessee*. The latter vessel was entirely unharmed by the *Hartford's* fire, and had it not been for the presence of the monitors *Chickasaw*, *Winnebago*, and *Manhattan*, the combat would have been decided against us. The shots that penetrated the rebel iron-clad were all from the fifteen-inch guns on the monitors, while the broadsides, so bravely poured in by the flag-ship, rebounded from the iron armor without injuring it in the least.

Since the memorable engagement in Hampton Roads, no more convincing proof of the utility of the monitors has been given. From the gallant admiral's report, it appears that he attacked the rebel iron-clad ram with his usual dash and vigor. Running close aboard, he poured in a tremendous broadside from his nine-inch guns. That broadside, which would have sunk a wooden ship, had no effect whatever upon the iron-clad; but the return fire was disastrous in the extreme, for the *Hartford*, the victor of numerous engagements, was riddled. To her relief came the *Monongahela* and the *Metacomet;* these also were wooden ships, and, beyond butting the ram, effected nothing. It was reserved for the monitors to finish this formidable rebel ship. The *Chickasaw*, a Mississippi iron-clad, ranged astern, and from her two turrets delivered the shots that caused the flag to come down. Commander Perkins deliberately and cooly aimed at the vital part, the rudder, and while he disabled this he also found time to send one shot through the after-port. This shot wounded Admiral Buchanan, and compelled him to surrender the ship. Two only were killed and as many more wounded on her; but the consternation occasioned by the crashing of the heavy shot through the coating deemed invulnerable, added to the helplessness of the ship from the loss of the rudder, made the rebel admiral lower his colors and give up his sword. He surrendered not to a wooden vessel but to an iron-clad; and he stated that so great was his anxiety to sink our flag-ship that he would himself have willingly gone down to accomplish the object.

We cut the following conclusive evidence of the utility of the monitors from the correspondent of the *Evening Post*, who writes from on board the flag-ship *Hartford*:—

"The entire fire of the large vessels was concentrated upon her now. We poured our whole broadside against her thick sides at a few yards distance, but it had no other effect than to to carry away her smoke-pipe. We were all preparing to butt her again, when the monitors came up and engaged her at close quarters with their heavy guns. In a little while it was discovered that she could not steer, and was drifting helplessly towards Fort Morgan. In a few minutes a white flag was waved through her grating—she had surrendered. *The iron-clad "Chickasaw" towed her up to us*, and Buchanan sent his sword to Admiral Farragut.

"The *Tennessee* surrendered because her admira was wounded. She could have made a long fight had the men not been so dispirited by his loss. Her stern port was so jammed by the same shot that wounded Buchanan that the gun could not be run out, but she still had five heavy Brookes rifles to use. Her stern and sides were very much battered by our shot. But one had penetrated her—this was a fifteen-inch solid shot from the *Manhattan*, the only shot of that size that struck her. The battle was finished three hours and a quarter from its commencement. We were under fire two hours and a quarter."

The monitors are too much for the rebels, and none know this better than they. The *Merrimac* was repulsed by the original *Monitor*, the *Atlanta* was captured by another one, the *Weehawken*, and four shots from the *Chickasaw* decided a three hours' contest. Had it not been for the presence of these vessels disaster would have befallen us. The whole wooden fleet would have undoubtedly been sunk, and instead of victory would have come the shameful tidings of defeat. The gallant hero of a hundred fights, Farragut, would have been captured, or worse—killed—and it is to the endurance of our iron-clads that we owe the advantage. None can admire more than ourselves the skill, courage, and coolness of Admiral Farragut, and we cheerfully add our voice to the praise showered upon him from all sides; but let us hear no more of the "worthless monitors." Iron hearts in wooden ships are undoubtedly good, but iron hearts in iron ships are better still.

CHUCKING WORK IN LATHES.

One of the most indispensable adjuncts of a lathe is a chuck for holding work that cannot be turned between the centers, or requires to be bored out. Very great ingenuity has been displayed in constructing chucks so that the piece held, if round, should run perfectly true without any further adjustment. To this class of chuck belongs the scroll, the worm and spiral gear chuck, and others; their utility is very great, and on some work they are indispensable.

Ordinary chucks have four jaws which slide in grooves in the face plate, and are set up by screws running through them. Such a chuck plate can be altered to take an irregular form, or one that has a hole out of the center, as an eccentric, but the scroll chuck cannot. The jaws in this move arbitrarily, or toward the center, and are therefore unchangeable; although we believe there is one variety of scroll chuck in the market that can be shifted so as to take an irregular form. It is surprising to see what clumsy work some men make in chucking a job. To set a simple pulley takes them half an hour, and at the end of that time the face is so covered with chalk marks that it looks as if it were whitewashed; hammer marks indent the work, and the workman loses his patience and gets out of temper for nothing. It is the simplest thing in the world to set a round job true in a few minutes, and without chalk, sticks, or any other aid. When a pulley is to be bored, the center should be put in the spindle and the size measured off to the chucks, one of them should be drawn out a little to let the work in, and when it is in place setting this slack jaw up will bring the pulley fair. One or two revolutions of the lathe will show in a moment if the outside is true. It is unnecessary to tell the mechanic that no work must be turned from the hole cored out rough. Many unthinking persons have done this to their own and the proprietor's sorrow; the cores not unfrequently get pushed on one side in casting, which makes the work all wrong if they be taken as the center.

Scroll chucks, in fact chucks of any kind, are costly tools, and not within the reach of every mechanic. To such, a common block of wood is by no means a useless thing. It is astonishing how much can be done in a wooden chuck when properly made. Very large sizes can be employed, and for very small work it is unequaled as a substitute for the metal chucks. Very frequently cements, such as gum-shellac, etc., are used in connection with the wooden chuck to hold small flat pieces that have no flange or other point to catch. An eccentric may be bored for the shaft and turned outside in a wooden chuck or on a face plate without the use of a chuck at all.

In cases of irregularly-shaped jobs, where it is at all practicable, the chuck plate should be taken off and laid on the bench, and the work set true upon it in that position; by the aid of the lines which are struck, or should be, on every plate, this can be done much more quickly than when the work is hanging by one or more bolts. In all cases the plate should be carefully used and cleaned when done with, not left to knock about on the floor under the lathe, or to get filled with grease, dirt, and chips.

CORN-HUSK STOCK FOR PAPER.

In common with the rest of newspaper publishers, we are very heavily taxed in the matter of paper. That which formerly cost us from ten to thirteen cents a pound now costs thirty cents, or nearly three times the expense formerly incurred, and paper makers are quite independent at these prices. We do not propose to enter into a discussion of the causes which have led to this unparalleled advance, but merely point out what seems to be one remedy for the present state of affairs. It is well understood by this time, among those most interested, that paper of all kinds known to commerce is now made from corn-husks. This is done in Austria, and the Hon. Isaac Newton, of the Agricultural Department, in Washington, has samples and a description of the process. We also have samples of not only the paper but of various other articles made from the refuse of the husks or that which does not enter into the composition of paper. Cloth is made from it, and stout and strong it is too. The gelatinous portion of the husk is also saved, so that from these items alone great profit is derived.

The cost of manufacture is the principal point to be looked at. The price of the stock is the first item, and that of reducing it to an article of commerce the next. The *Illinois Farmer*, an able periodical published in the center of the great corn-growing region of the West, appends a note to a former article of ours on this subject, republished in the paper aforesaid, in which the editor asserts that corn-husks can be sold for three cents per pound at a handsome profit to the farmer. The process of preparing them is thus described:—

"Our plan is to pick or jerk the corn, put it in the barn, and in bad weather or evenings husk it; spread the husks in the same loft to dry, and when dry run them through a threshing machine. A railway power with separator is the best for this use. When the corn is cut up and shocked, a good husker will save about one hundred pounds per day of husks. Of course the number of bushels husked will be much less than when the husks are not saved."

The husking can be easily accomplished by machinery if necessary, which would materially reduce the cost, or enhance the profit of the manufacturer. The husks are simply boiled in a solution of lime and soda, which frees the fibrin, leaving it intact. From this fiber the paper stock is made, and the cost of manufacture it will be seen is much lower than rags. It is not as a novelty that we would point out the advantages which this stock has to paper-makers, but for the purpose of inducing unemployed capital to embark in it. Rags at 10 to 12 cents a pound, and corn-husks at 3 cents, leave a wide margin for profit. What is to prevent corn-husk paper from being put into the market by tuns next year? Now is the time to secure the fall crop of husks.

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FUTURE PROSPECTS FOR MECH NICS.

When the war shall have ceased this country will present a scene of industry unparalleled in history. War always devastates and destroys, and in the old countries of the world, where slower methods and no systems are employed, it takes generations to repair the damage of a great conflict. On some of the older battle-fields of the Revolution the marks of earth-works are still plainly visible.

But in the after time, when the present struggle is decided, our mechanics will have opportunities to display their energy and skill to the utmost. The States laid waste by the tramp of contending armies must blossom anew, and be plowed, not with fire and sword, but by the sturdy teeth of some machine. The mills which are now silent, and used only as refuges for sharp-shooters, must grind or saw again in the future; and the steam engines, which are rusted and bent out of shape, be repaired. The water wheels must be adjusted so that they whirl vigorously with their loads. There are factories razed to the ground which must be again raised, and the thousands and tens of thousands of spindles which now rest idly in their frames, must fly in a short time as swiftly as of old. So of those steamers which once furrowed the sea, but are now wrecked, or sunk, or otherwise lost to the commerce of the world—they must be replaced. Down the slanting ways to the sea the new keels shall glide, while the sun-burnt carpenters and the engineers watch their crafts' baptism with pride. The railroads shall reach out their arms again; they shall lace the prairies, they shall stretch away to the illimitable West. From all corners of our favored land the locomotive shall bear us plenty and prosperity. Many roads are now broken and so destroyed that they will have to be re-surveyed, and here the professional man will claim his share with the artisan. The locomotives have been burnt and destroyed by hundreds, and they will require to be reproduced with all the celerity our shops are capable of.

Substantial rewards seem, nay, are certain, in the future for those who are now laboring to restore, not destroy, the Government. Mechanics, more than any other class in the community, have a direct interest in its maintenance, and should be the last—as we believe they are—to encourage its enemies in any way. Self-interest, if not patriotism, should be an incentive to put forth every effort to restore tranquility and peace.

ERICSSON, THE "SCIENTIFIC AMERICAN," AND THE DAILY PRESS.

In the year 1853 the daily papers of this city announced a great invention by John Ericsson, which was to supersede the steam engine as a more economical and efficient moter. The SCIENTIFIC AMERICAN quietly but distinctly expressed the opinion that the invention would prove a failure. But our modest voice was drowned in the general hurrah over the brilliant invention. A great ship was constructed with enormous engines, and for a whole year we carried on a controversy against the leading papers of the city in regard to the practicability of the scheme. The invention was a failure; the air engines were taken out of the ship and steam engines were introduced in their place.

We have recently been engaged in another controversy with the daily press of the city in regard to another invention of Mr. Ericsson's, the monitors. On this occasion the positions are reversed—the SCIENTIFIC AMERICAN believing in the soundness of the mechanical appliances employed, while the daily papers agree in denouncing the invention. The recent brilliant triumph of the monitors in Mobile Bay is as conclusive proof of the soundness of our position in the present case, as was furnished by the result in the former controversy.

COLBURN'S "LOCOMOTIVE ENGINEERING."

An English locomotive is so essentially different rom an American engine, both in design and the execution of its details, as to be almost another machine. The purpose of the two machines is of course the same, but there is a marked contrast in the several parts. Mr. Zerah Colburn has devoted a great deal of time, labor, and, we doubt not, careful research, in compiling examples of the latest English engines, and has presented them in connection with the earliest efforts of inventors, so that his work constitutes, in its present condition, a perfect epitome of the most wonderful machine of the times.

The work is issued as a serial by Mr. John Wiley, of 535 Broadway, New York, and each number is in quarto form of 16 pages, containing six large wood engravings. These engravings demand more than a passing notice. They are elaborate and accurate, and are, in fact, working drawings. They are not school-boy pictures of engines, with lines beginning nowhere, and ending in the same place; they are not "philosophy diagrams," where the governor of the steam engine is sometimes represented spinning on the rim of the fly-wheel, and the injection water sputtering fearfully into the cylinder; but they are plain, faithful, and to an engineer, distinct views in elevation, plan, and section, of the best, and probably the worst (for there must be *some* worst) modern engines used in English railway practice. These engravings give precisely the information an engineer wants in plain figures, in the appropriate places. The sizes of the flues, the length and the number of them are given in the body of the boiler, just where the tubes would be. The length of the fire-box, and the thickness of its inner and outer sheets, as well also the depth of the water spaces, the angles formed by the grates, the highth to the crown sheet, the length of the boiler in the clear, the sizes of the cylinders, and the stroke of piston, are all given. These are the minor details, and it is here that we have looked first for some omission or inaccuracy; in the greater parts it would be unpardonable in such a work to notice an error. We have not found any omissions of consequence, and engineers not only readily grasp the main idea of these machines, but also learn the value of accuracy in statement and in detail.

In reviewing this work hastily, as we have been obliged to do by reason of our numerous engagements, we have noticed the very marked difference in detail between English and American engines, which we alluded to in the commencement of this article. For instance, the draw-bar on the English engine has its back end attached to a volute spring on the under part of the foot-board; this very much lessens the jerk, surge, and "backlash," of the train behind, and is also a measure of safety to the parts under strain. With a light train, however, it might be inoperative, while with a heavy one the spring would shut up. There are many advantages in it, however, apart from this objection. A better plan than the volute spring would be a steam cylinder and piston. For a light train but little pressure could be placed between the piston and cylinder head, while the pressure could be increased at will for heavy trains so as to always preserve the tension on the bar and elasticity unimpaired. The fire-boxes are immense on some English engines, no less than seven feet in length; they burn coal, not coke, and in many of them the grates are inclined at an angle of at least 30° from the door down to the damper forward. There is moreover a general lightness of detail in the links and their connections not observable with us, while the framing is entirely different in its general construction.

Apart from the value which attaches to this work as an example of English locomotive practice, our American engineers are promised examples of their own skill and handiwork, in contrast with that of their English brethren. This feature will render it additionally valuable.

Mr. Zerah Colburn, the author, is the editor of the London *Engineer*, and while we have not always agreed with him on some professional points, we can heartily commend his book, in its promise and performance, as an invaluable contribution to the general but scanty stock of engineering information.

Mr. John Wiley will send the work to all who desire it at $1 per number, issued monthly, and no mechanic in any repair-shop or locomotive establishment should be without it. A dollar a month is a small sum for such information as the work contains.

TRANSPARENT JAPAN.—Oil of turpentine, four ounces; oil of lavendar, three ounces; camphor, one-half drachm; copal, one ounce; dissolve. Used to japan tin, but quick copal varvish is mostly used instead.

REDUCING ALUMINUM BY ZINC.

We translate from *Le Genie Industriel* the description of a new process for obtaining aluminum, recently patented by M. N. Basset, chemist, of Paris. If the statements are correct they are of great value:—

"The alkaline metals have been erroneously regarded heretofore as the only reducers of the chloride of aluminum, double or single, and this error has contributed to maintain this new meeal at its elevated price.

"All of the metaloids and the metals which form, by double decomposition, protochlorides or sesquichlorides, more fusible or more volatile than the double chloride of aluminum, may operate the reduction of the salt, as well as of the single chloride; thus, arsenic, boran, cyanagen, zinc, antimony, mercury, and even tin, the amalgams of zinc, of antimony, and of tin, may be employed to reduce the chloride of aluminum single or double. The author intends to apply the legal privilege accorded by his demand for a patent to this general principle as well as to the particular application which follows. He employs zinc by preference in consequence of its low price, of the facility of its employment, of its volatility, and of the property which it presents of metalizing easily the aluminum in measure as it is set free.

"When there is put in presence of the double chloride of aluminum with zinc [we translate literally] at the temperature of 250° to 300° (centigrade) there is formed chloride of zinc and free aluminum. This dissolves in the zinc in excess, and the chloride of zinc, combining with the chloride of sodium, the mass becomes little by little pasty, then solid, while the alloy remains fluid. If the temperature is raised the mass melts anew; the zinc reduces a new proportion of chloride, and the excess of zinc enriches itself proportionally.

"These facts constitute the base of the following general process. One equivalent of the chloride of aluminum is melted, and when the vapors of hydrochloric acid are dissipated four equivalents of zinc, in powder or in grain, is introduced. The zinc melts rapidly, and by agitation the mass of the chloride thickens and solidifies. This is the first operation.

"This mass, composed of chloride of aluminum, chloride of sodium, and chloride of zinc, is piled in a crucible or in a furnace and the fluid alloy (*l'alliage coule*) is placed above. The heat is gradually raised to a bright red, and this temperature is maintained for an hour. The melted mass is stirred with a rake, and poured out. It is an alloy of aluminum and zinc in pretty nearly equal proportions. This is the second operation.

"This alloy, melted on some chloride which has been subjected to the first operation, furnishes aluminum containing only a small per cent of zinc, which disappears by a new fusion under the chloride mingled with a little fluoride, provided the temperature is raised to a white heat and maintained till the cessation of the vapors of zinc, in the absence of air. The aluminum obtained is pure if the zinc employed contains no foreign metals. It suffices to remelt it to cast it into ingots.

"In case the zinc contains iron, or even if the chloride of aluminum holds a portion of that metal, the metallic product of the second operation may be treated with dilute sulphuric acid. The insoluble residue is washed and melted, layer by layer, with fluoride of calcium or cryolite, and a small quantity of double chloride, destined solely to favor the fusion.

"The principles and the method which precede, constitute, according to the author, a new and economical manufacture of aluminum."

SPECIAL NOTICE.

CALISTA E. SABIN, executrix of HARNEY W. SABIN, of Canandaigua, N. Y., has petitioned for the extension of a patent granted to him on Dec. 3, 1850, for an improvement in horse rakes.

It is ordered that the said petition be heard at the Patent Office, Washington, on Monday, Nov. 21, 1864.

All persons interested are required to appear and show cause why said petition should not be granted. Persons opposing the extension are required to file their testimony in writing, at least twenty days before the final hearing.

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EFFECT OF A FIFTEEN-INCH SHELL ON THE "TENNESSEE."

On another page we give a description of the rebel ram *Tennessee*, as she appeared after the battle. It will be observed that all of the shot from the 9-inch guns—the most powerful ordnance afloat in any navy but ours—glanced from her armor-plates like hail from a slate roof, but when a 15-inch shell from the monitor *Manhattan* struck her side, though it did not go through, it smashed the side in, and sent a shower of splinters in all directions, producing precisely the effect anticipated of the ponderous missiles by Major Barnard and our other ordnance officers. We note as points of interest in this matter, that the ram's armor was made up of three feet of wood and six inches of iron, pretty nearly on the most approved English plans, except that the iron is in three plates instead of two, and the sides were inclined at a considerable angle. We hope some of our friends in the fleet will inform us at what distance and with what charge this shell was fired, and at what angle it struck the side of the *Tennessee*.

Cost of Fuel on Railroads.

The following interesting matter we copy from the report of the Pennsylvania Railroad Company in the *Railroad Record*. It relates to the expense of providing fuel for the engines, and gives some valuable practical suggestions relative to altering wood-burning engines into coal burners:—

FUEL AND ITS COST.

Fuel is getting now to be one of the most costly and important items in railroad account.

If we estimate this account by the price paid for fuel in 1862, it will stand comparison with other years, as follows:

1859—Cost of fuel per 100 miles run, $7 50
1860—Cost of fuel per 100 miles run, $7 17—Saving 42c.
1861—Cost of fuel per 100 miles run, $6 41—Saving 72c.
1862—Cost of fuel per 100 miles run, $5 98—Saving 43c.
1863—Cost of fuel per 100 miles run, $5 37—Saving 61c.

Being a saving of 61 per 100 miles over the cost of last year, while the additional mileage has been made by new ten-wheel engines, of the larger class, and consequently using the maximum amount of fuel, as they have been worked to their full capacity.

It is very gratifying to find the above saving in fuel amounting to ten pounds per mile as compared with last year. There are but few wood-burning engines now remaining on the road. The fire-brick deflector, lately applied to some of our engines, converts the old wood-burners into the best coal-burners, at a price not exceeding $50. It is now being applied as fast as the engines can be spared for the purpose. The use of this deflector will enable us to go back to the plain fire-box, as the best calculated for the perfect combustion of bituminous coal, and at the same time, the most accessible for thorough inspection and repairing. The latter items are becoming more important, as it almost impossible to get good iron, and the safety of life and property is largely dependent on the most thorough inspection and prompt repairs of the boilers.

Experiments have been made with anthracite coal on passenger trains, which proved unsuccessful compared with bituminous coal. The trial was made with an engine built expressly for anthracite, and was furnished with all the latest improvements. The engine has been changed to use bituminous coal.

Then we have one of the most interesting and important developments resulting from railroad experience. It is that even on the forest covered mountains of Pennsylvania, wood can no longer compete with coal, as fuel for engines. Not only this, but that anthracite will not do. Substantially, we may consider it a fact, that *bituminous coal is hereafter to be the principal fuel of railroads*. There are few roads which will make exceptions to this rule, when a few years more have passed by. Ohio was a densely wooded country, and most of our railroads, in consequence of seeking the lowest grade, passed through wooded districts; yet, on our main lines, the wood is disappearing at a rate which will soon put it out of the power of the railroad companies to command wood, under a very high price. In former articles on this subject, we showed that the railroads of Ohio consumed (12,000) *twelve thousand acres of wood per annum*. At this rate it is very evident wood can not be consumed by railroads very long at any moderate rate. It seems that the Pennsylvania Railroad uses none but coal engines, thus making a demonstration that there is no real difficulty in using coal.

Artificial Ivory.

In a lecture before the Society of Arts, London, Dr. Crace Calvert called attention to the following mixture for ivory surfaces for positive pictures: "Finely-pulverized sulphate of baryta is mixed with gelatine or abumen, compressed into sheets, dried and polished. These sheets are ready for use in the same way as ivory plates."—*Technologist.*

[We should be glad to try some of this new surface. There is a great need, in the practice of the photographic art, for a paper or tissue, white in color, with a smooth surface like ivory or glass, upon which to produce the pictures.—EDS.

NEW YORK MARKETS.

[WEEK ENDING AUGUST 24, 1864.]

Ashes—Pot, $13 50; pearl, $15 50 per 100 lbs.

Beeswax—85c. per lb.

Bread—Pilot, navy, crackers, 6¼c. to 12c. per lb.

Candles—Adamantine, stearine and sperm, 37c. to 65c. per lb.

Cement—Rosendale, $1 60 per barrel.

Coffee—Java, 58c. to 59c. per lb.; Rio, 51c.; St. Domingo, 38c. to 44c

Copper—American ingot, 51c. to 54c. per lb.; bolts, 72c.; Sheathing, 72c.

Cordage—Manilla, 2Sc. per lb.; Russia—tarred, 25c.; American, 20c.

Cotton.—Ordinary, $1 72 per lb.; Middling, $1 90; Fair, $2.

Domestic Goods.—Sheetings, brown standard, 68c. per yard; Shirtings, brown, 7-8, standard, 52c.; Prints, Merrimack 41c.; Prints, other 30c. to 33c.; Flannels, 45c. to 80c.

Dyewoods, Duty Free.—Fustic, $75 per tun; Logwood, $33 to $50; Lima Wood, $180.

Feathers—85c. to 90c. per lb.

Furs.—Otter, $8 to $12 skins; Lynx, $4 to $6; Muskrat, 30c. to 50c

Flax—20c. to 30c. per lb.

Flour and Meal—$9 40 to $14 25 per barrel: Rye Meal, $8 25 to $11; Corn Meal, $7 80 to $8 45.

Grain.—Wheat, $2 25 to $2 86 per bushel; Rye, $1 80; Barley, nominal; Oats, 93c. to 95c.; Corn, $1 58 to $1 85; Peas, $1 90 to $1 92; Beans, $2 50 to $2 85.

Hay—$1 30 per 100 lbs.

Hemp.—American (dressed), $320 to $360 per tun; Russian, $600; Jute, $330 to $340.

Hides.—City Slaughter, 15½c. to 16¾c.; other varieties range from 17c. to 38c.

Honey.—$1 50 to $1 72½ per gallon.

Hops.—20c. to 37c. per lb.

India Rubber.—$1 40 to $1 60 per lb.

Indigo.—Bengal, $2 10 to $3 per lb.; others, $1 50 to $2 40.

Iron.—Scotch pig, $75 to $76 per tun; American, $73 to $74; Bar—Swedes—; English, $205 to $235; Sheet—Russia, 32c. to 35c.; English, 10c. to 14c.

Lead.—American, $16 50 to $14 75 per 100 lbs.; English, $16 50 to $16 75; Pipe, 22c.

Leather.—Oak-tanned, 30c. to 58c. per lb.; Hemlock, 30c. to 55c.

Lime.—$1 25 to $1 75 per barrel.

Lumber.—Spruce, $25 to $27 per 1,000 feet; White Oak, $35 to $40; White Oak Staves, $110 to $250; Mahogany crotches, 80c. to $1 50 per foot; Rosewood, 4c. to 12c. per lb.

Molasses.—80c. to $1 18 per gallon.

Nails.—Cut, $10 per 100 lbs.; Wrought, 45c. to 51c. per lb.

Oils.—Linseed, $1 69 to $1 70 per gallon; Sperm, $2 25 to $2 55; Petroleum, crude, 55c.; refined, 87c. to 90c.; Naphtha, 48c. to 50c.

Provisions.—Beef, mess, $13 to $15 per barrel; Pork, mess, $37 to $40 50; Butter, 42c. to 56c. per lb.; Cheese, 18c. to 26c.

Rice.—$12 50 to $16 per 100 lbs.

Salt.—Turk's Island, $1 per bushel; Liverpool fine, $5 50 per sack.

Saltpeter.—25c. to 28c. per lb.

Spelter.—17½c. to 17¾c. per lb.

Steel.—English, 18c. to 45c. per lb.; German, 24c. to 36c.; American cast, 20c. to 34c.; American spring, 20c. to 24c.

Sugar.—Brown, 19c. to 28c. per lb.

Tea.—80c. to $1 80 per lb.

Tallow.—American, 20c. to 20¼c. per lb.

Tin.—Banca, 80c. per lb.; English, 64c.; plates, $18 50 to $24 per box.

Tobacco.—Leaf, 17c. to 40c. per lb.; Cuba fillers, 55c. to 65c.; United States wrappers, 25c. to 65c.; Manufactured, 55c. to 95c.

Wool.—American Saxony fleece, $1 to $1 10 per lb.; Merino, 95c. to 97c½.; California, 30c. to 65c.; Foreign, 30c. to 70c.

Zinc.—23c. per lb.

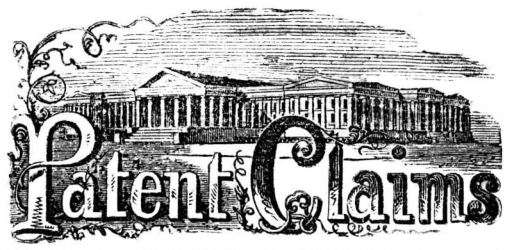
TO OUR READERS.

INVARIABLE RULE.—It is an established rule of this office to stop sending the paper when the time for which it was pre-paid has expired.

MODELS are required to accompany applications for Patents under the new law, the same as formerly, except on design patents, when two good drawings are all that are required to accompany the petition, specification and oath, except the Government fee.

RECEIPTS.—When money is paid at the office for subscriptions, a receipt for it will always be given; but when subscribers remit their money by mail, they may consider the arrival of the first paper a *bona-fide* acknowledgement of our reception of their funds.

PATENT CLAIMS.—Persons desiring the claim of any invention which has been patented within thirty years, can obtain a copy by addressing a note to this office, stating the name of the patentee and date of patent, when known, and enclosing $1 as fee for copying. We can also furnish a sketch of any patented machine issued since 1853, to accompany the claim, on receipt of $2. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.



ISSUED FROM THE UNITED STATES PATENT-OFFICE

FOR THE WEEK ENDING AUGUST 23, 1864.

Reported Officially for the Scientific American.

☞ Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

43,890.—Sewing Machine.—Jos. Anger and Jos. Prestele, New York City:

I claim first, The employment or use of a toothed disk, c, of untanned leather or raw hide and meshing with the ordinary driving gear, D, of a sewing machine, as and for the purpose described.

Second, The arrangement of the adjustable friction rollers, p p', upon the cam lever, F, in combination with the projecting rim, e, of the cam, E, constructed and operating substantially in the manner and for the purpose herein specified.

Third, The arrangement of the adjustable jaw-piece, N, and toggle-piece, u, in combination with the feed lever, S, and feed wheel, R, constructed and operating substantially as and for the purpose set forth.

43,891.—Composition Iron.—Wm. M. Arnold, New York City:

I claim mixing copper, tin, and zinc, using borax as a flux, with common iron, in about the proportions and in the manner substantially as described, bearing in mind that the relative increase by any common multiplier of the ingredients of copper, tin and zinc will relatively increase my purposes and objects in making the said composition.

43,892.—Tuyere.—Wm. Welden Ball, Grandview, Ill.:

I claim the cap, C, provided on the under side and around its central opening with a downwardly projecting flange, c, in combination with the dome shaped plate, A, having a depression A2, in the top, the edge of which dome shaped depression rises above the edge of the flange, c, as shown and described and all parts arranged for joint operation in the manner and for the purpose specified.

43,893.—Brick Machine.—Wm. Barker and Gaylord Martin, Schenectady, N. Y.:

We claim, first, Automatically feeding the mould boxes, from one side of, and near the front part of the machine, up to their work, by giving to said boxes a transverse, and a longitudinal movement substantially as described.

Second, The employment of two followers, E E', in combination with the platforms, D D', and press box, C, the same being arranged as to operate substantially as described.

Third, Making the platform, D, vertically adjustable, when this platform is pivoted at one end and supported at or near the other end upon a rocking bar, or upon rocking arms, or their equivalents, substantially as described.

Fourth, The construction of the vertically reciprocating plauger frame of guide rods, j j, pawls, l l, adjustable cross head, k, and reciprocating cross head, h', substantially as and for the purposes herein described.

Fifth, Making the follower, E, adjustable, substantially as and for the purposes described.

Sixth, Giving the required movements to the several parts of the machine from a single central shaft, B, through the medium of spur wheel, B', pinions, b', b2, and cranks, g2 g3, in combination with the finger, m, all operating substantially as described.

Seventh, The arrangement of a receiving platform, and follower, on one side of a brick machine, having a press box applied to a pug-mill, substantially as and for the purposes described.

43,894.—Machine for surface-sizing Wadding, &c.—Samuel Baxendale, South Malden, Mass.

I claim the combination of the deflector, I, with the rotary brush, G, the sizing roller and trough and machinery for supporting the bat, and moving it along substantially as specified.

43,895.—Friction Device for the Yarn-beam of Looms.—Alonzo Beebe and Francis L. Bestor, Enfield, Mass.:

We claim the employment of a flexible friction band, D, of leather or other similar material upon the drum, C, regulated as to tension by the two crossed levers, E E, and their tightening screw, F.

[The object of this invention is to supply a means of producing and regulating the friction on the yarn beam of a loom, whereby such friction will be rendered more uniform than that produced by the levers and weights at present in use and cockling of the cloth will be effectually prevented, and which also prevents the weaver from so easily altering the friction.]

43,896.—Whip-socket Fastening.—Edwin Chamberlin, Lansingburgh, N. Y.:

I claim a whip-socket fastening having a clamp or holder, B B, for a whip-socket, combined with jaws, A A, for embracing or griping a bar or rod, in a covered "dash" or other part of a carriage or other vehicle, substantially as herein described.

43,897.—Draft Regulator and Ventilator.—Gardner Chilson, Boston, Mass.:

I claim my improved draft regulator as made with a continuous pipe, A, perforated with a series of air holes, a a a, the air register, B, and the chamber, D, being arranged with such pipe and holes, substantially as specified

43,898.—Locomotive Engine.—Isaac H. Congdon, Springfield, Ill.:

I claim the jet pipes, D D, communicating with the exhaust pipes C C, and employed in conjunction with the hopper shaped box, E' and discharge pipe, E, to cause the sparks, &c. to pass out and be deposited at the under side of the engine and at the same time deaden or extinguish the same, substantially in the manner and for the purpose specified.

43,899.—Washing Machine.—John Cram, Boston, Mass.:

I claim the combination of a vibrating or reciprocating roller, C, or its equivalent, with a series of flexible or elastic bands, c c c, arranged below it, and for use in a tub, substantially in the manner and for the purpose described.

I also claim the elastic or flexible bands, c c, as made square or several sided in transverse section and twisted, or as having helical grooves when such bands are combined with a roller and for use in manner and for the purpose as herein specified.

I also claim the combination of the looped springs, h h, with the vibrating roller, C, and its frame and the series of flexible or elastic bands, c c c, arranged together as specified.

I also claim the combination of the grating or series of parallel bars, a a a, with the elastic bands, c c c, and the roller, C, arranged in the manner and so as to operate together as specified,

I also claim the series of flexible or elastic bands arranged together and in a frame, B, and for use in a tub, in manner and for the purpose as specified.

43,891.—Invalid Bed.—Josiah Crosby, Manchester, N. H.:

I claim first, The combination of the bedstead, A, and revolving bed rails, a, and a', and the device for operating the same with the adjustable transverse bands, j j, constructed substantially as described and for the uses and purposes set forth.

Second, The combination of the bedstead, A, and revolving bed

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rails, a, and a′, and adjustable bands, j j, with the trundle bed so arranged that it may be raised in contact with the bands, j j, substantially as described.

Third, The combination of the bedstead, A, bed rails, a, and a′, the devices for operating the same and the transverse bands, j j, with the bands, h h, the hooks, p p, and the trundle bed B, substantially as described for the uses and purpose set forth.

43,901.—Cultivator.—D. M. Davis, (assignor to himself and W. L. F. Jones) Asbury, Ill.:

I claim the combination and arrangement ot the lever, l, the rod, r, the vibrating lever, C, the rod, r′, and the plow-beam, E, when constructed and operating substantially as herein delineated and described

43,902.—Calf-feeder.—William C. Dodge, Washington, D. C.:

I claim first, An artificial teat constructed substantially as described for feeding calves and similar young animals.

Second, I claim providing the same with means whereby it can be readily attached to, or detached from the vessel containing the food.

Third, I claim securing the artificial teat to a float substantially as and for the purpose as set forth.

43,903.—Battery Gun.—William Douglass, Corry, Pa.:

I claim first, the plate, E, (with the four gun barrels attached) the same operated by the lever, N, or its equivalent so that the two can be brought in a horizontal position as described when the same are constructed as described and in the aforesaid combination.

Second, I claim the cylinder, w w, in combination with the lever, G, the slides, y x, the pawls, v v′, and the ratchet wheel, u u, in combination with the lock, Fig. 8, constructed as described and in the aforesaid combination for the purposes set forth.

Third, I claim the iron frames, D D, hung on pivots, in the frames, B B B′ B′ B′′ B′′, in combination with the plate, E, the cylinder, w, w, the lock fig. 8, when the same is constructed as described in the aforesaid combination for the purposes set forth.

43,904.—Apparatus for displaying Bills-of-fare.—James Faye, Philadelphia, Pa.:

I claim a bill of fare whose lines shall be movable, rotary, and mutually independent; maintaining at the option of the caterer, a position on either edge or on either side, by means of the axes, and bearings above described, or by other adjuncts essentially the same; the whole being constructed and operated substantially in the manner and for the purpose set forth.

43,905.—Clothes and Hat Rack.—Henry E. Fickett, Brooklyn, N. Y.:

I claim the use or employment of the reversible hooks, A, in combination with the rails, B, when said hooks, A, shall be so constructed that they shall form pivots upon which the rails, B, turn, for the purpose herein specified.

43,906.—Cigar Shaped-Smoker.—D. D. Foley, Washington, D. C.:

I claim the construction of a cigar shaped smoker, with an external shell or case, A, containing a long bowl or tobacco chamber, B, supported and held in place by the small studs or projections, b b b b, so as to leave a space around it, combined and arranged substantially as described and for the purpose set forth.

3,907.—Tobacco-pipe Stem.—D. D. Foley, Washington, D. C.:

I claim the double cylinder pipe stem constructed of an outer cylinder, B, attached to the lower end of the inner cylinder or smoke-tube, C, and with the air-space or receptacle for saliva, E, surrounding it, formed and arranged substantially as described.

43,908.—Turning Lathes.—Andrew Goodyear, Springport, Mich.:

I claim first, The arrangement and combination of the sliding carriages and rests, F′ F2 F3, cutters, c c c, &c., sliding frame (composed of the sides, D D, and transverse guide bars, E E E E,) and stationary guide bars, C C, arranged and operated in relation with the lathe proper, substantially as and for the purposes herein described.

Second, Combining with each set of cutters, c c, &c., one or more of the cutter guides, J, as set forth.

Third, Marking for the spoke, creases, automatically by the use of the lever, I, and screw stop, S, in combination with the spring rod, R, and marker, M, as specified.

43,909.—Hog Snout-cutter.—Samuel Hair, Kankakee City, Ill.:

I claim first, Making the cutting edge, a, of the bit, A, pointed, curved, or lance shaped, substantially as and for the purpose specified.

Second. I claim the slot, b, in combination with the bit, A, when the latter is made with a lance shaped edge or a straight cutting edge, for the purpose specified.

Third, I claim the combination of the bit, A, bars, B and E, and handle or lever, F, substantially as and for the purpose described.

43,910.—Rotary Steam Valve.—Herman Haupt, Cambridge, Mass.:

I claim an equilibrium valve constructed as described with reference to the steam, gas, air or water induction and eduction openings or passages and partitions, for operation substantially as set forth.

The herein described arrangement of balance valves for operation in the manner and for the purposes described whereby the usual outside contrivances for actuating the valve may be dispensed with as set forth.

43,911.—Lamp.—Benjamin F. Hebard, Dorchester, Mass.:

I claim forming the wick tube of a fluid lamp of otherwise ordinary or suitable construction of two different materials; that is to say, making the tip or burner of a metal and good conductor of heat and of a length to vaporize the requisite amount of fluid drawn up by the capillary action of the wick, and the tube proper of block-tin or other bad conductor of heat so that the heat of the burner may not be transmitted to the vessel containing the fluid substantially as set forth.

43,912.—Hydraulic Press.—Michael Hittinger, Charlestown, Mass.:

I claim the combination of the stationary cammed projections and recesses applied to the platen, with the rotary amulus provided with fellow-cammed projections and recesses, and applied to the piston and so as to operate thereon, and on the cylinder substantially as specified.

43,913.—Rotating Plow.—John Headley, Zanesville, Ohio:

First, I claim in combination with the shaft, i, and guide wheel, r, the arm, t, lever, u, and wheel, v, for elevating, lowering and regulating the depth of the furrow, when constructed in the manner as and for the purpose set forth.

Second, The guide wheel, r, when arranged in the manner set forth for supporting the plow when operating or plowing.

Third, The combination of the wheels, r, and l, arranged and operating substantially as set forth, for regulating the depth of the furrows.

Fourth, The brace, n, connecting the axle, c c′, of the walking wheel, with the plow shaft, i i, and supporting the latter outside of the walking wheel, d′.

Fifth, The use of the rotating plows, attached to the shaft outside the walking wheel, when said shaft is supported by a brace or other equivalent device, attached to the outer end of the axle of the walking wheel.

43,914.—Hair Pin.—Joseph Charles Howell, of Washington, D. C.:

I claim giving a spiral form to a hair pin, substantially as shown and described.

43,915.—Lock for Jail doors.—Enoch Jacobs, Cincinnati, Ohio. Ante-dated Oct. 19, 1861.

I claim, First, The combination of the longitudinal sliding bar, G, swinging bars, f, and clutches or dogs, c, the latter so constructed and arranged as to operate the swinging bars, f, or to be separately disengaged from the same, substantially as and in the manner and for the purpose set forth.

Second, The combination of the elbow, X, and vertical bar, Y, with the pall clutches or dogs, c, by which the latter or either of them may be disengaged from its respective swing-bar, f, permitting any number of cells to be opened by the movement of the longitudinal bar, G, while the rest remain locked, as set forth.

Third, Operating the clutches or dogs by the same key which operates the lock bolt, and simultaneously therewith, substantially in the manner described.

Fourth, Enclosing the bar, G, and pall clutches or dogs, c, in the casing, F, for the purpose set forth.

43,916.—Coal Hod.—Edwin A. Jeffery, New Haven, Conn.:

I claim a coal hod provided with a spiral agitator, B, or its equivalent, to cause the coal to pass to the lowest part and flow therefrom with greater facility.

43,917.—Double-acting Pump.—Wm. S. Kelley, Schenectady, N. Y.:

I claim, first, The use or a water receiving chamber, H, intermediate or between the piston and the discharge pipe, when the piston is operated from a point below the receiver, and the piston rod terminates within the receiver and plays water-tight in the stuffing-box thereof, substantially as and for the purposes set forth.

Second, The construction of the piston, A, with a valve chamber, B, and inlets, C D, above and below, and one or more outlets, above the chamber and leading into the piston rod, substantially in the manner described.

Third, So constructing the chamber, B, with its inlet and outlet passages, C D and E2, and employing a single valve therein, that the piston will enable the pump to operate, substantially in the manner set forth.

43,918.—Mode of raising Sunken Vessels.—Casper Krogh and M. G. Hogness, Kroghsville, Wis.:

We claim, first, The combination and arrangement of the tubes, A B and C, when operating substantially as and for the purpose set forth.

Second, The combination and arrangement of the rod, E, the weight, D, and the tube, C, when operating and constructed substantially as herein described.

Third, The tubes or pipes, F and H, when constructed substantially as delineated and set forth.

Fourth, The braces, b b, provided with the links, N, substantially as and for the purpose set forth.

Fifth, The combination and arrangement of the tubes, F and H, and the valves, J, when operating substantially as described.

43,919.—Wheel Carriage.—William H. Lewis, Green wood, Mass.:

I claim the combination of the semi-elliptic spring, G, with the thorough braces, E E, the side springs, F F, and their cross bar, c, the whole being arranged and so as to co-operate substantially as herein-before explained.

43,920.—Governor Cut-off Valve.—K. H. Loomis, Baltimore, Md.:

I claim the employment in combination ot the block, A, secured to stem, d, arm, e, wrist pin, h, face plate, f, stud, g, in the manner substantially and for the purpose of regulating the flow of steam to the cylinder of steam engines, as set forth.

43,921.—Bee-hive.—Thomas H. Mathews, Rushville, Ill.:

I claim the application of the metallic curtain, as above described, to the bee entrances of the bee-hive, through which the bees will pass freely, and through which the bee moth or miller will not pass, and thus preventing the moth or miller from depositing its eggs in the hive

43,922.—Time Fuse for Explosive Shells.—Martin McDevitt, Beloit, Wis.:

I claim the T-shaped fuse, A B, the central stem being introduced into the axis of the projectile at the front, while the arms are bent to correspond to the shape of the projectile held in longitudinal channels in the same, and filled with composition, and graduated so as to be cut to suit the time of flight, substantially as and for the purpose set forth.

43,923.—Channeling Machine.—Gordon McKay, Boston, Mass., and Lyman R. Blake, Quincy, Mass.:

We claim the spring, f, when applied to operate in connection with a toothed feed wheel and presser bar or roll.

We also claim the adjustable presser foot, g, operating in connection with the feed wheel, a, or the spring, f, to regulate the depth of cut of the channeling knives, without displacement or adjustment of the knives.

43,924.—Door Bell.—Marshall B. Ogden, Fond du Lac, Wis.:

I claim, first, The arrangement and combination of the hammer, F, with the hinged piece, H, coiled springs, G and L, and hook, M, for striking the gong, substantially in the manner set forth.

Second, I claim the hinged piece, H, for facilitating the tilting of the hammer and the return of the hook, M, substantially in the manner and for the purposes set forth.

43,925.—Derricks for stacking Hay.—Timothy G. Palmer, Greeneville, N. Y.:

I claim the combination of the derrick and frame work, when the latter is constructed with the bevelled sills, a a, passing forward of the braces, d d, that sustain the arm, c, in the manner specified, so that the derrick and its bevelled sills can be withdrawn from the stack, when formed as specified.

43,926.—Pipe Wrench.—William Pearson, Windsor Locks, Conn.:

I claim the arrangement of the lever, 1, jaw, 2, knuckle, 3, jaw, 4, pin, 5, and spring, 6, in combination with each other, by which arrangement the result set forth is accomplished

43,927.—Sewing Machine.—Louis Planer, New York City:

I claim the arrangement of the driving shaft, A, the second shaft, B, the crank pin, o′, the peculiarly shaped slotted piece, O, upon the needle slide, the collars, D D′, the connecting rod, E, in combination with the adjustable crank pin, f, crank, F, shaft, C, connecting rod, g, and crank, G, all constructed and operating in the manner and for the purpose herein shown and described.

43,928.—Spring-catch Button.—T. K. Reed, East Bridgewater, Mass., and H. F. Packard, North Bridgewater, Mass.:

We claim the improved rotating spring-catch button, when made and operating substantially as described.

43,929.—Breech-loading Fire-arm.—George J. Richardson, Philadelphia, Pa.:

I claim securing the barrel to the frame by the combined use of the slot and recess in the lug of the barrel, and the two pins passing through the frame and the slot, or slot and recess, substantially as and for the purpose set forth.

43,930.—Skirt-supporting Corset.—L. S. Scofield, Boston, Mass.:

I claim the improved corset, as constructed with the skirt-supporting straps, arranged and operating substantially as set forth.

43,931.—Toilet Comb.—Isreal H. Southworth, Essex, Conn.:

I claim a comb composed of pieces, a a, matched and secured in a handle, b, substantially in the manner herein described.

43,932.—Machine for incising Button-holes and embossing and printing Articles of Wearing Apparel.—Samuel S. Stone, Troy, N. Y.:

I claim, first, The combination in one machine for finishing cuffs, collars, and wrist-bands, of a pressing, punching, printing, and embossing mechanism, with a break and belt shipper, substantially as and for the purpose described.

Second, The combination of two end button-holepunches for cuffs, collars, or wrist-bands, having longitudinal and axial adjustment, with a reciprocating platen and corresponding receiving dies having a like adjustment on a stationary bed-plate, substantially as and for the purpose described.

Third, The central button-hole punch having an adjustment across the collar as well as an axial one, in combination with the platen and end punches, and with a central receiving die having like adjustment in the fixed bed-plate, substantially as and for the purpose described.

Fourth, The vertically adjustable and reciprocating platen, in combination with embossing plates, and with end or end and central adjustable button-hole punches and their dies on the fixed bed-plate, when operating to ornament and punch cuffs, collars, or wrist-bands, substantially in the manner described.

Fifth, The combination of a printing-block with the adjustable reciprocating platen, button-hole punches, embossing plate, receiving dies, and stationary bed-plate, for the purpose of printing (while punching and embossing) cuffs, collars, or wrist-bands, substantially in the manner described.

Sixth, The reciprocating adjustable platen with its punches, types, and embossing-plates, in combination with guide pins and fixed bed-plate when the guide pins can be varied in position, to secure a perfect register of the punching, printing, and embossing of cuffs, collars, and wrist-bands, however varied in size or form, substantially as set forth.

43,933.—Machine for dressing Heads to Barrels.—Wm. Trapp, Elmira, N. Y. Ante-dated Aug. 16, 1864:

I claim, first, The shape and construction of the bed-plate, T, attached to the endless chain, N, as herein described, and for the purposes set forth.

Second, I also claim the combination of the revolving cutter and planing-knife, with the feeding apron, when they are constructed and arranged substantially as described.

43,934.—Machine for dressing Staves to Barrels.—Wm. Trapp, Elmira, N. Y. Ante-dated Aug. 16, 1864:

I claim, first, The use of the bed, O, when inclined sidewise in relation to the cutters, for the purpose of cutting mostly from the thick edge of the stave in rounding and backing the same without wasting the thin edge of the stave, substantially in the manner set forth.

Second, I claim inclining the beds, O and k, before and behind the cutters, so that a crooked or winding stave may easily pass through the machine, touching the beds only at or near the cutters.

Third, I claim the use of the changeable beds, O and O′, for altering the machine and thus adapting it to working different kinds ot staves, substantially as set forth.

Fourth, I claim the sliding frame, T, for carrying the feed works up and down, substantially as set forth.

Fifth, I claim the employment of the feed works or feed devices, as a weight acting on the binder, to hold the stave steady, substantially as described.

Sixth, I also claim the arrangement and combination of the feed rollers, D and E, the cog wheels, I and L, and the pinions, H and K, with the sliding frame, T, substantially as set forth.

43,935.—Machine for jointing Heading for Barrels.—William Trapp, Elmira, N. Y. Ante-dated Aug. 16, 1864:

I claim, first, The above-described rotary jointer, B, with its face looking obliquely outward, for the purpose of jointing pieces of heading, hollow or concave, and thus making an open joint, substantially in the manner and for the purposes set forth.

Second, The construction and arrangement of the above described jointing and boring machine, provided with the rotary jointer, B, and bed, E, and the bits, N, and movable carriage, O, all operated substantially in the manner and for the purpose described.

43,936.—Derrick for stacking Hay.—Seth Turner, Onargo, Ill.:

I claim the arm, l, and weight, p, in combination with the ropes, m and g, and revolving derrick, for the purposes and as specified.

43,937.—Machine for weaving Cords or Coverings around Cords.—Florence Veerkamp and Francis Leopold, Philadelphia, Pa.:

We claim, first, A series of bobbins so arranged as to move radially from and towards a given center, in combination with a bobbin which moves continuously around the said center and across the paths of the other bobbins, substantially as and for the purpose set forth.

Second, The plates, A and A′, with the openings, a and b, when constructed and arranged for the reception and operation of the plates, d, and rod, J, substantially as specified.

Third, The disk, G, with its grooves, c and c′, and rod, J, when arranged and operating substantially as described for the purpose specified.

43,938.—Thimble for Steam Boilers.—Samuel Wethered, Baltimore, Md.:

I claim a device for protecting the ends of flues of steam boilers, super-heaters, etc., constructed of a split tube with a grooved face flange, c, substantially as and for the purposes herein described.

43,939.—Hay-elevating Fork.—James A. Whitney, Maryland, N. Y.:

I claim attaching the draft rope, F, directly to the fork, at or near its head, B, when the said rope operates in connection with the tongue, C, rigidly secured to the head, B, and with a catch, n d m, or its equivalent, as shown, whereby I am enabled to dispense with the bail usually employed in such devices, all for the purpose and in the manner substantially as herein set forth and described.

43,940.—Shuttle for Looms.—Warren Wilder, Wilkinsonville, Mass.:

I claim the combination of the extended spindle-head, B, as seen at 1 and 3, with the top spring, E, and shuttle and catch spring, C, when the extensions of said spindle-heads are in contact and operate upon spring, E, and catch, C, in the manner and for the purposes shown and described.

43,941.—Sawing Wood by Wind-power.—Joel Wisner, East Aurora, N. Y.:

I claim a wind-wheel constructed with the flat wings, O, and flanges, f, in combination with the shaft, F, and pivoted standard, A, constructed and operating substantially as and for the purposes set forth.

I also claim the combination and arrangement of the wheel, O, pivoted standard, A, and platform, B, with the saw, L, pitman, I, and crank, K, substantially in the manner and for the purposes described.

43,942.—Road-scraper.—John B. Wood, Swansey, Mass.:

I claim the combination and arrangement of the guard, E, with the blade, B, and roller, C, applied to the beam, A, provided with handles, as specified.

43,943.—Gathered Fabric.—Henry S. Brown, New York City, assignor to Alfred Arnold, North Englewood, N. J.:

I claim, as a new manufacture, a gathered fabric wherein each gather is held firmly in place by a thread, which necessarily and invariably passes through the cloth between the gathers, and wherein the gathers resemble curved corrugations rather than more sharply defined folds or plaits, substantially as herein described.

43,944.—Composition for Paint.—Willard F. Cronkhite assignor to Henry Noxon and Orville M. Cronkhite), Syracuse, N. Y.:

I claim the combination of the several ingredients as described, in the manner substantially as and in about the proportions set forth.

43,945.—Buckle.—George Havell, Newark, N. J., assignor to Frederick Stevens, Harrison Township, N. J.:

I claim the projections, a a, forming the notches, g g, for the reception and securing of the pivots, c c, in the manner and for the purpose described.

43,946.—Hay-elevating Fork.—John B. Hawley (assignor to Peter Mesick, Albany, N. Y.:

I claim a lever applied to a brace in a hay fork and connected to the discharging rope or cord, to move the said brace in discharging the hay, substantially as specified.

43,947.—Folding Cradle.—Joseph A. Latham & George W. Tileston (assignors to said George W. Tileston), New Haven, Conn.:

We claim the combination of the legs, A B, with rocker, C, when constructed and arranged to fold, substantially in the manner described.

43,948.—Apparatus for Carbureting Air.—Hugh L. McAvoy (assignor to himself and Elias S. Hutchinson), Baltimore, Md.:

I claim the combination of the gravitating air holder, B, charged in the act of raising by an automatic valve, with the generating apparatus, C, substantially as herein described.

43,949.—Valve for Steam Engines.—John Jacob Miller (assignor to himself and Ernst Prussing), Chicago, Ill. Ante-dated Feb. 15, 1863:

I claim, first, The combination of the fixed cylindrical seat, A, and cylindrical valve, D, with an adjusting wheel, G, or other substantially equivalent device to regulate the effective stroke of the said valve, as explained.

Second, The spring, J, and pin, K, used in the described combination with the aperture, g, in the wheel, G, and the slot, f, in the valve rod, F, to lock the said wheel to the said rod or permit it to be turned up or down thereon, as and for the purpose explained.

43,950.—Piston Packing.—John Jacob Miller (assignor to himself and Ernst Prussing), Chicago, Ill. Ante-dated Feb. 15, 1863:

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I claim, first, The combination of the fibrous or other elastic and permeable filling, D or D′, with segments, C or C′, formed with angular or expanding joints, substantially as and for the purposes explained.

Second, The regulating screws, E or E′, used in the described combination with the segments, C or C′, and filling, D or D′, constructed and operating as explained.

43,951.—Liquid Separator.—John Jacob Miller (assignor to himself and Ernst Prussing), Chicago, Ill. Antedated Feb. 15, 1863 :

I claim, first, A float operating within a suitable containing vessel to open and close ports on different levels in such a manner as to effect the separate and automatic discharge through the said ports of two or more fluids separated in said vessel by their unequal specific gravities.

Second, In combination with a float operating within a containing vessel to automatically open and close ingress or egress ports, I claim the use of perforated plates, K, to lessen the commingling of the inflowing liquids with those already contained in the vessel, as explained.

43,952.—Steam Pump.—John Jacob Miller (assignor to himself and Ernst Prussing), Chicago, Ill. Antedated Feb. 15, 1863 :

I claim, first, The combination of the float, E, and rotary shaft, B, operating substantially in the manner explained to open and close the steam or water ports of the cylinder, A, as explained.

Second, The perforated and rotating plate, D, employed in the described combination with the shaft, B, and float, E, to distribute the condensing water, as explained.

Third, The plates, G G1 G2, employed in the described combination with the float, E, to prevent the mingling of the heated with the fresh water, as explained.

Fourth, The use of a stratum of fatty matter employed in a steam pump operating substantially as above described, to prevent injurious contact between the steam and water, as set forth.

Fifth, The manner of regulating the length of stroke by adjusting the cams, 1 2 3 4, substantially as set forth.

Sixth, The combination of the cylinder, A, spiral shaft, B b, perforated plate, D, float, E, plates, G G1 G2, and valves, L M, all constructed, arranged and operating substantially as and for the purposes set forth.

43,953.—Coal Oil Lamp.—Jacob Mowery (assignor to himself and James H. Spencer), Philadelphia, Pa. Ante-dated June 16, 1863 :

I claim the curved and perforated plates, H and H′, arranged on the dome or its equivalent, of a coal oil lamp, in respect to the wick tube, substantially as and for the purpose herein set forth.

43,954.—Eyelet.—Edward Parker (assignor to Hotchkiss Manufacturing Company), Middletown, Conn.:

I claim the use of perforated flat surfaced disks in the manufacture of eyelets, substantially as described.

43,955.—Apple-parer.—E. L. Pratt, Boston, Mass., assignor to George R. Carter, Boston, Mass., and D. H. Goodell, Antrim, N. H.:

I claim so constructing a segmental rack paring machine that the fork revolves opposite the center of the rack, substantially as specified.

I also claim the employment of the cam, m, to throw the knife beyond the path of motion of the fork and geers, substantially as described.

Also the construction of the slot or bearing surface over which the knife rod moves for the purpose of paring to the center of the apple, as described.

43,956.—Peach-parer.—E. L. Pratt, Boston, Mass., assignor to George R. Carter, Boston, Mass., and D. H. Goodell, Antrim, N. H.:

I claim the combination of the spring and crank rod, operating in the manner and for the purpose substantially as set forth.

I also claim the means of regulating the extent of movement of the knife, by the action of the screw, g, upon the end of the knife rod, which is inclined, and made movable with respect to the surface of the arm, c, to which it is jointed, the screw arm and knife rod being constructed and operating with respect to each other, substantially as specified.

I also claim constructing the inclined prongs with grooves or depressions to hold the peach stone, substantially as above set forth.

43,957.—Breech-loading Fire-arm.—Wilson H. Smith (assignor to himself and Royal M. Bassett), Birmingham, Conn.:

I claim, first, The combination of a breech-piece, containing the cartridge chamber, with a sliding wedge-like abutment, or back piece, substantially as described for the purpose set forth.

Second, I claim the employment in combination with a movable chambered block and a sliding abutment of a mechanism or device for extracting the cartridge case and discharging it from the gun, substantially in the manner set forth.

43,958.—Rounding Machine.—E. M. Stevens (assignor to Alfred B. Ely), Boston, Mass.:

I claim, first, The use of a stationary pattern in combination with a continuously traveling cutter.

Second, Combining a yielding or sliding cutter with a traveling carriage.

Third, So constructing and arranging the traveling cutter that its cutting edge shall substantially correspond with the center of motion of its shank.

Fourth, So forming and arranging the traveling cutter that while in operation its edge shall be turned and presented at all times so as to cut the material in a line substantially parallel to, or in the same plane with the edge of the pattern.

Fifth, So arranging the traveling knife that it may be set or adjusted to cut the edge of the leather, etc., to any required bevel.

Sixth, The combination of a spring with the travelling cutter for the purpose of keeping the latter up to the pattern.

Seventh, So constructing the pattern and clamp that one or both of them may be turned for the purpose of cutting heel and toe alternately.

Eighth, The lever, P, in combination with the spring, n, and slide, e, for adjusting the pressure of the rounding knife to patterns of different sizes.

43,959.—Apparatus for Feeding Wool, etc., to Carding and other Machines.—Jean Sebastien Bolette, Gofontaine-Cornesse, Belgium :

I claim the method of and apparatus for feeding wool and other textile and filamentous substances into carding, combing, and other machines, for treating such substances as hereinbefore described.

43,960.—Mercury-packed Pumps.—Paul Marcelin, Chambery, France :

I claim a pump composed of one or more reciprocating tubes or cylinders communicating with induction and eduction pipes and working within a chamber of mercury or other fluid or semi-fluid of a much greater specific gravity than the atmosphere, said chamber being between two cylinders or tubes, and all arranged to operate in the manner substantially as herein set forth.

RE-ISSUES.

1,741.—Portable Hut.—Andrew Derrom, Paterson, N. J. Patented July 9, 1861 :

I claim, first, The right and left battens, H, on the sections, G, in combination with the buttons, I, in the manner and for the purpose herein described.

Second, The angular blocks, a, with angular dove-tail slots, b b′, formed in them, in the manner and for the purpose described.

Third, The construction and combination of the sills, A A′ e, studs, B B′ j j′, rafters, D D i, girders, C C i, siding sections, G G1 G2 H I J, and dove-tail fastenings, in the manner and for the purposes herein described.

Fourth, The combination of the section, G, with inner and outer stops, and the sections, G1 G2, with bolts, for the purpose of forming the sides and ends of a house with intermediate posts or studs, substantially as described.

Fifth, The application of dove-tail fastenings, which lock both in a longitudinal and transverse direction, for the purpose and in the manner herein described.

1,742.—Portable Hut.—Andrew Derrom, Paterson, N. J. Patented July 9, 1861 :

I claim so erecting the sides and ends of a house, of sections of uniform or nearly uniform size, that a section at intervals may be readily taken out without disturbing the framing, substantially as and for the purposes set forth.

Second, So disposing dove-tail fastenings or their equivalents, and the sections of the sides and ends of the house, that while the dove-tail fastenings or their equivalents, serve to lock the frame together, the sections of sidings, etc., serve to lock the dove-tail fastenings or their equivalents, substantially as and for the purposes set forth.

1,743.—Harvester.—Edwin Jones, Chester Cross-roads, Ohio. Patented March 27, 1860 :

I claim, first, The combination and relative arrangement of frames, A and F, with each other and their supporting wheels, B B′ and G, substantially as and for the purpose above described.

Second, Arranging or locating the shoe which supports the heel of the finger beam in a mowing machine, in combination with an arm or supporting piece rigidly connected with the shoe, and which extends back of the shoe and is connected to the frame which supports the gearing and driver by a compound or double joint, for the purposes as shown and described.

Third, I also claim the combination with the frame and shoe of a harvesting machine, connected by a supporting piece extending from the rear of the shoe to the frame and attached thereto by a double joint, of a lateral sustaining brace upon the opposite side from the finger beam so arranged as not to interfere with the free rising and falling of the entire finger beam, nor with the folding of the same at the grass side of the machine, substantially as shown and described.

Fourth, The inclined plane or wedge, i, with the heel of the cutter bar, substantially as described.

1,744.—Harvester.—Edwin Jones, Chester Cross-roads, Ohio. Patented March 27, 1860 :

I claim, first, Connecting the front end of the right angled lever, k, to the front elevated end of the shoe which supports the heel of the finger beam by a flexible connection, arranged to work up and down in front or advance of the front inner corner of the main frame, when there is ample room without interfering with the frame or other working parts of the machine.

Second, In a mowing machine having the finger beam arranged so as to give a "front side cut" as it is generally called, combining the supports of the finger beam, and the connection of the shoe with the front end of the lever by which the cutting apparatus is raised substantially as described, so that one of the supports of the finger beam will be in rear of said lifting cord, and the shoe which supports the heel of the finger beam, and on a line or nearly so, with a vertical plane passing through the axis of the main supporting wheels, while the other is at or near the front outer corner of the main frame, thus enabling the heel of the finger beam to be raised by power applied at or near the angle formed by its extending supports.

Third, In a mowing machine supporting the finger beam to which the guard fingers are attached, by two supports, one of which is at or near the front outer corner of the main frame, while the other supporting device is connected to and extends back from the shoe which supports the heel of the finger beam on a line at right angles, or nearly so, to the first connection or extension piece, and is supported outside of the main frame, at a point nearly on a line with a vertical plane passing through the main supporting wheels, both connections being such as to allow the fingers to rise and fall to pass over irregularities in the ground without raising the front of the main frame in the same proportion.

1,745.—Harvester.—Edwin Jones, Chester Cross-roads, Ohio. Patented March 27, 1860 :

I claim, first, The arrangement of the folding frame to support the grain platform in combination with the main frame and raker's seat, substantially in the manner and for the purpose specified.

Second, I also claim the combination with a folding grain platform to a rear delivery reaping machine, as set forth in the above first clause of claim of a lever, k, arranged and operating substantially as and for the purposes stated.

Third, Hinging the frame, F, to a support on the inner side of the main frame, and at a point within the periphery of wheel, B′, in combination with hinging or supporting the front by a coupling arm, O.

Fourth, The raker's seat, S, in the described combination with frame, F, and the main frame, whether said seat is made to front at an angle to the line of motion of the machine or not.

Fifth, Seat, S, with frame, F, which supports the grain platform when arranged in relation to each other, in the manner and for the purposes herein shown and described.

1,746.—Harvester.—Andrew Whiteley, Springfield, Ohio, assignee by mesne-assignments of John J. Weeks, Oyster Bay, N. Y. Patented Sept. 26, 1854 :

I claim, first, The combination of the tongue, C, fulcrum pin, a, frame, A, post, U, fulcrum pin, v, lever, V, and connecting link, w, or their equivalents, substantially as herein shown and described for the purposes specified.

Second, The combination of the tongue, C, fulcrum pin, a, frame, A, post, U, fulcrum pin, v, lever, V, connecting link, w, holding standard, W, and pin, Z, or their equivalents, substantially as herein shown and described for the purposes specified.

Third, The combination of the tongue, C, fulcrum pin, a, frame, A, finger bar, D, the open space herein described between the shoe, E, the frame, A, and the vertical plane in which the driving wheel, L, moves, the post, U, fulcrum pin, v, lever, V, and connecting link, w, or their equivalents, substantially as herein shown and described for the purposes specified.

Fourth, The combination or the tongue, C, fulcrum pin, a, frame, A, finger bar, D, the open space herein described, between the shoe, E, frame, A, and the vertical plane in which the driving wheel, L, moves, the post, U, fulcrum pin, v, lever, V, connecting link, w, holding standard, W, and pin, z, or their equivalents, substantially as herein shown and described for the purposes specified.

Fifth, The combination or arrangement of the following parts or elements in a harvester: the tongue, C, fulcrum pin, a, frame, A, a finger bar with a track clearer in rear of its outer end, the driving wheel, L, grain wheel, I, post, U, fulcrum pin, v, lever, V, and connecting link, w, or their equivalents, for joint operation.

Sixth, The combination or arrangement of the following parts or elements in a harvester: the tongue, C, fulcrum pin, a, frame, A, shoe, E, finger bar, D, track-clearer, H, driving wheel, L, grain wheel, I, post, U, fulcrum pin, v, lever, V, connecting link, w, holding standard, W, and pin, Z, or their equivalents, substantially as herein shown and described for the purposes described.

Seventh, The combination or arrangement of the following parts or elements in a harvester: the short cutter herein described, the narrow divider herein described, a finger bar having in rear of its outer end a track-clearer, the tongue, C, fulcrum pin, a, frame, A, wheels, L and I, post, U, fulcrum pin, v, lever, V, and connecting link, w, or their equivalents, for the purposes specified.

Eighth, The combination or arrangement of the following parts or elements in a harvester: the short cutter herein described, the narrow divider herein described, a finger bar having in rear of its outer end a track-clearer, the tongue, C, fulcrum pin, a, frame, A, wheels, L and I, post, U, fulcrum pin, v, lever, V, connecting link, w, holding post, W, and pin, Z, or their equivalents, for the purposes specified.

Ninth, The construction and connection of the sections of harvesters' cutters to the cutter bar in such a manner that each alternate section of the cutter will have its cutting edges at the lower side, while the other sections will have their cutting edges at the upper side, and the adjoining edges be a sufficient distance apart at their rear ends to be ground while on the cutter bars.

1,747.—Harvester.—Andrew Whiteley, Springfield, Ohio, assignee by mesne-assignments of John J. Weeks, Oyster Bay, N. Y. Patented Sept. 26, 1854 :

I claim, first, The combination of the short cutter herein described, with the narrow divider herein described.

Second, The combination of the short cutter herein described, with the narrow divider herein described, and having one of these portions of it, against which the crop is cut, of a less width than the other.

Third, The combination of the short cutter herein described, with the narrow divider herein described, and having one of those portions of it, against which the crop is cut, of a less width than one-half the length of a section of said cutter.

Fourth, The combination of the short cutter herein described, with the narrow divider herein described, and having a portion of it extended backward under and secured to the finger bar,

Fifth, The combination of the short cutter herein described, with the narrow divider herein described, and having one of those portions of it, against which the crop is cut, of a less width than the other, and a portion extended backward under and secured to the finger bar.

Sixth, The combination of the short cutter herein described, with the narrow divider herein described, and having one of those portions of it, against which the crop is cut, of a less width than one-half of the length of a section of said cutter, and a portion extended backward across and connected to the finger bar.

Seventh, The combination of the short cutter herein described, with the narrow divider herein described, and having a portion of it extended in rear of the finger bar.

Eighth, The combination of the short cutter herein described, with the narrow divider herein described, and having that portion of it which crosses and is connected to the finger bar, extended further inward than those portions against which the crop is cut.

Ninth, The combination or arrangement of the following parts or elements in a Harvester: the short cutter herein described; the narrow divider herein described, and a track clearer for the purposes specified,

Tenth, The combination and arrangement of the following parts or elements in a harvester, the short cutter herein described; and a revolving track clearer for the purposes specified.

Eleventh, The combination or arrangement of the the folliwing parts or elements in a harvester: the short cutter herein described; the narrow divider herein described; a finger bar having in rear of its outer portion a track clearer, and the fulcrum pin, a, or an equivalent thereof which will enable this cutting and clearing apparatus to rise and fall with the undulations of the ground and cut the grass close thereto.

1,748.—Post-office Stamp.—Jacob Shavor and Albert C. Corse, (Assignees of Marcus P. Norton) Troy, N. Y. Patented April 14, 1863.

We claim first, The postage-canceling device, C, with "wood," "cork" or "rubber" type or blotter, G, therein, or any equivalents therefor, so as to cancel, blot, or efface the postage stamp with indelible or other ink in the manner and for the purposes substantially as herein described and set forth.

Second, We claim the canceling device, C, with wood, cork or rubber or any equivalent thereof, forming the type or blotter. G, therein, in combination with the cross piece, B, and with the post-marking device, D, substantially as and for the purposes herein described and set forth.

Third, We claim the post-marking of letters, envelopes, and packets and the cancelation of the postage stamps thereon with ink at one and the same blow or operation of the instrument in the manner and by the means substantially as herein described and set forth.

Fourth, We claim the employment and combination of post mark ing device with postage-stamp canceling device, both being operatee by one or the same handle for the post-marking the letter, envelop or packet and for the destruction of postage-stamps thereon with indelible or other ink, substantially as described.

EXTENSION.

Obstetric Chairs and Supporters.—Asa Blood, Janesville, Wis. Patented August 27, 1850.

I claim an obstetric chair with its seat composed of sections hinged together substantially in the manner and for the purpose herein set forth.

I also claim a chair-back, hinged to the seat in such manner that it can turn both horizontally and vertically substantially in the manner herein set forth.

I likewise claim the combination of the stirrups with the abdominal pad substantially in the manner and for the purpose herein set forth

PATENTS

GRANTED

FOR SEVENTEEN YEARS!

MUNN & COMPANY,

In connection with the publication of the SCIENTIFIC AMERICAN, have acted as Solicitors and Attorneys for procuring "Letters Patent" for *new inventions* in the United States and in all foreign countries during the past *seventeen years*. Statistics show that nearly ONE-THIRD of all the applications made for patents in the United States are solicited through this office; while nearly THREE-FOURTHS of all the patents taken in foreign countries are procured through the same source. It is almost needless to add that, after *seventeen years'* experience in preparing specifications and drawings for the United States Patent Office, the proprietors of the SCIENTIFIC AMERICAN are perfectly conversant with the preparation of applications in the best manner, and the transaction of all business before the Patent Office; but they take pleasure in presenting the annexed testimonials from the three last ex. Commissioners of Patents :—

MESSRS. MUNN & CO.:—I take pleasure in stating that, while I held the office of Commissioner of Patents, MORE THAN ONE-FOURTH OF ALL THE BUSINESS OF THE OFFICE CAME THROUGH YOUR HANDS. I have no doubt that the public confidence thus indicated has been fully deserved, as I have always observed, in all your intercourse with the office, a marked degree of promptness, skill, and fidelity to the interests of your employers. Yours very truly,

CHAS. MASON.

Judge Mason was succeeded by that eminent patriot and statesman, Hon. Joseph Holt, whose administration of the Patent Office was so distinguished that, upon the death of Gov. Brown, he was appointed to the office of Postmaster-General of the United States. Soon after entering upon his new duties, in March, 1859, he addressed to us the following very gratifying letter:

MESSRS. MUNN & CO.:—It affords me much pleasure to bear testimony to the able and efficient manner in which you discharged your duties as Solicitors of Patents, while I had the honor of holding the office of Commissioner. Your business was very large, and you sustained (and I doubt not justly deserved) the reputation of energy, marked ability, and uncompromising fidelity in performing your professional engagements.

Very respectfully, your obedient servant,

J. HOLT

Hon. Wm. D. Bishop, late Member of Congress from Connecticut, succeeded Mr. Holt as Commissioner of Patents. Upon resigning the office he wrote to us as follows:

MESSRS. MUNN & CO.:—It gives me much pleasure to say that, during the time of my holding the office of Commissioner of Patents, a very large proportion of the business of inventors before the Patent Office was transacted through your agency; and that I have ever found you faithful and devoted to the interests of your clients, as well as eminently qualified to perform the duties of Patent Attorneys with skill and accuracy. Very respectfully, your obedient servant,

WM. D. BISHOP.

THE EXAMINATION OF INVENTIONS.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submit it to us, with a full description, for advice. The points of novelty are carefully examined, and a written reply, corresponding with the facts, is promptly sent, free of charge. Address MUNN & CO., No. 37 Park Row, New York.

As an evidence of the confidence reposed in their Agency by inventors throughout the country, Messrs. MUNN & CO. would state that they have acted as agents for more than TWENTY THOUSAND inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of inventors and patentees, at home and abroad. Thousands of inventors for whom they have taken out patents have addressed to them most flattering testimonials for the services rendered them; and the wealth which has inured to the individuals whose patents were secured through this office, and afterwards illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! Messrs. MUNN & CO. would state that they never had a more efficient corps of Draughtsmen and Specification Writers than those employed at present in their extensive offices, and that they are prepared to attend to patent business of all kinds in the quickest time and on the most liberal terms.

PRELIMINARY EXAMINATIONS AT THE PATENT OFFICE.

The service which Messrs. MUNN & CO. render gratuitously upon examining an invention does not extend to a search at the Patent

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Office, to see if a like invention has been presented there; but is an opinion based upon what knowledge they may acquire of a similar invention from the records in their Home Office. But for a fee of $5, accompanied with a model, or drawing and description, they have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a patent, &c., made up and mailed to the inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through the Branch Office of Messrs. MUNN & CO., corner of F. and Seventh streets, Washington, by experienced and competent persons. Many thousands of such examinations have been made through this office, and it is a very wise course for every inventor to pursue. Address MUNN & CO., No. 37 Park Row, New York.

HOW TO MAKE AN APPLICATION FOR A PATENT.

Every applicant for a patent must furnish a model of his invention if susceptible of one; or, if the invention is a chemical production, he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the inventor's name marked on them, and sent, with the Government fees, by express. The express charge should be pre-paid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by a draft on New York, payable to the order of Messrs. MUNN & CO. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but, if not convenient to do so, there is but little risk in sending bank bills by mail, having the letter registered by the postmaster. Address MUNN & CO., No. 37 Park Row New York.

Patents are now granted for SEVENTEEN years, and the Government fee required on filing an application for a patent is $15. Other changes in the fees are also made as follows:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Re-issue	$30
On application for extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design (three and a half years)	$10
On filing application for Design (seven years)	$15
On filing application for Design (fourteen years)	$30

The Patent Laws, enacted by Congress on the 2d of March, 1861, are now in full force, and prove to be of great benefit to all parties who are concerned in new inventions.

The law abolishes discrimination in fees required of foreigners, excepting natives of such countries as discriminate against citizens of the United States—thus allowing Austrian, French, Belgian, English, Russian, Spanish and all other foreigners, except the Canadians, to enjoy all the privileges of our patent system (except in cases of designs) on the above terms. Foreigners cannot secure their inventions by filing a caveat; to citizens only is this privilege accorded.

CAVEATS.

Persons desiring to file a caveat can have the papers prepared in shortest time by sending a sketch and description of the invention. The Government fee for a caveat is $10. A pamphlet of advice regarding applications for patents and caveats is furnished gratis, on application by mail. Address MUNN & CO., No. 37 Park Row, New York

REJECTED APPLICATIONS.

Messrs. MUNN & CO. are prepared to undertake the investigation and prosecution of rejected cases, on reasonable terms. The close proximity of their Washington Agency to the Patent Office affords them rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Their success in the prosecution of rejected cases has been very great. The principal portion of their charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted, are invited to correspond with MUNN & CO., on the subject giving a brief history of the case, inclosing the official letters, &c.

FOREIGN PATENTS.

Messrs. MUNN & CO., are very extensively engaged in the preparation and securing of patents in the various European countries. For the transaction of this business they have offices at Nos. 66 Chancery lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. They think they can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through their agency.

Inventors will do well to bear in mind that the English law does not limit the issue of patents to inventors. Any one can take out a patent there.

Circulars of information concerning the proper course to be pursued in obtaining patents in foreign countries through MUNN & CO'S Agency, the requirements of different Government Patent Offices, &c., may be had, gratis, upon application at the principal office, No. 37 Park Row, New York, or any of the branch offices.

SEARCHES OF THE RECORDS.

Having access to all the official records at Washington, pertaining to the sale and transfer of patents, MESSRS. MUNN & CO., are at all times ready to make examinations as to titles, ownership, or assignments of patents. Fees moderate.

INVITATION TO INVENTORS.

Inventors who come to New York should not fail to pay a visit to the extensive offices of MUNN & CO. They will find a large collection of models (several hundred) of various inventions, which will afford them much interest. The whole establishment is one of great interest to inventors, and is undoubtedly the most spacious and best arranged in the world.

MUNN & CO. wish it to be distinctly understood that they do not speculate or traffic in patents, under any circumstances; but that they devote their whole time and energies to the interests of their clients.

COPIES OF PATENT CLAIMS.

MESSRS. MUNN & CO., having access to all the patents granted since the rebuilding of the Patent Office, after the fire of 1836, can furnish the claims of any patent granted since that date, for $1.

THE VALIDITY OF PATENTS.

Persons who are about purchasing patent property, or patentees who are about erecting extensive works for manufacturing under their patents should have their claims examined carefully by competent attorneys, to see if they are not likely to infringe some existing patent, before making large investments. Written opinions on the validity of patents, after careful examination into the facts, can be had for a reasonable remuneration. The price for such services is always settled upon in advance, after knowing the nature of the invention and being informed of the points on which an opinion is solicited. For further particulars address MUNN & CO., No. 37 Park Row New York.

EXTENSION OF PATENTS.

Many valuable patents are annually expiring which might readily be extended, and if extended, might prove the source of wealth to their fortunate possessors. Messrs. MUNN & CO. are persuaded that very many patents are suffered to expire without any effort at extension, owing to want of proper information on the part of the patentees, their relatives or assigns, as to the law and the mode of procedure in order to obtain a renewed grant. Some of the most valuable grants now existing are *extended patents*. Patentees, or, if deceased, their heirs, may apply for the extension of patents, but should give ninety days' notice of their intention

Patents may be extended and preliminary advice obtained, by calling or writing to MUNN & CO., No. 37 Park Row, New York.

ASSIGNMENTS OF PATENTS.

The assignment of patents, and agreements between patentees and manufacturers, carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American Agency, No. 37 Park Row, New York.

UNCLAIMED MODELS.

Parties sending models to this office on which they decide not to apply for Letters Patent and which they wish preserved, will please to order them returned as early as possible. We cannot engage to retain models more than one year after their receipt, owing to their vast accumulation, and our lack of storage room. Parties, therefore, who wish to preserve their models should order them returned within one year after sending them to us, to insure there obtaining them. In case an application has been made for a patent the model is in deposit at the Patent office, and cannot be withdrawn.

It would require many columns to detail all the ways in which the Inventor or Patentee may be served at our offices. We cordially invite all who have anything to do with patent property or inventions to call at our extensive offices, No. 37 Park Row, New York, where any questions regarding the rights of Patentees, will be cheerfully answered.

Communications and remittances by mail, and models by express (prepaid) should be addressed to MUNN & CO. No. 37 Park Row, New York

Notes and Queries

R. B., of Iowa.—The prices of the metals fluctuate so rapidly with our fluctuating currency that quotations at one time are very uncertain indications of the price at another. At the present time copper wire for electro-magnets, No. 16 covered with cotton and shellac, is worth about $1 75 per lb., and there are about sixty feet to the pound. The same covered with gutta-percha (English) is worth $2 25 per lb. No. 23 silk covered with wire $2 25 per lb. No. 30, $4 per lb. All articles for telegraphing may be obtained of Charles G. & J. N. Chester, No. 104 Center street, New York.

E. S. H., of N. Y.—No plan for measuring very high degrees of heat has yet been devised that is regarded as reliable by physicists. Wedgewood's pyrometer was based on the supposition that cylinders of clay would contract in proportion to the degree of heat to which they were exposed; but this supposition being erroneous, his instruments have gone out of use. Daniell's pyrometer is now held in highest favor; it is formed by inserting a rod of platinum into a cylinder of plumbago, and the degree of heat is measured by the amount of expansion of the platinum rod.

J. M. G., of Ohio.—The idea that the little worms, called hair snakes, are changed from horse-hairs is simply ridiculous. There is no propriety in calling them snakes. Worms and snakes belong to different divisions of the animal kingdom. Snakes have backbones, and therefore belong to the division of vertebrates, while worms are articulates. We published some time since a very interesting account, by Professor Agassiz, of the affection of this low order of animals for their eggs.

G., of ——It is a common rule in newspaper offices to pay no attention to communications unless they are accompanied by the names of the writers. If you will compute the area of the cross section of a vessel by the rule enacted in the new law, and will compare this with the true geometric area, you will find that the legal rule is inaccurate, whatever difference of opinion there may be in regard to its being clumsy and complicated.

W. A., of N. J.—We recently read that Messrs. Coffee & Risdon of San Francisco, Cal., advertise to pay machinists and engineers from five to seven dollars in gold per day, with steady work the year round. This is a handsome sum, and as California is a growing State no doubt you can find the chance there you are disappointed of here. We thank you for your compliment, and should recommend you to advertise for such a situation as you desire.

H. B. W., of N. Y.—Your query will be illustrated by a diagram. It is an interesting suggestion. We do not wish to discuss the utility of rotary engines, you will find numerous arguments against them in back numbers of the SCIENTIFIC AMERICAN Address H. C. Baird, 406 Walnut street, Philadelphia, for a work on steam engines.

H. J. S., of Pa.—We are obliged for your suggestions concerning the range, but it strikes us as unpractical. It would seem much easier to elevate a grate of a range or stove than to lower the whole top which might have other vessels not desirable to concentrate the heat upon. The idea suggested by Mr. Stevens was to concentrate the heat upon one point, and it seems to us an easy manner to set a grate so that it can be raised as he describes.

W. T., of Pa.—Your steam drum should be placed over the hottest part of the boiler, that is as nearly over the fire-box as practicable. The further the steam is from the source of heat the greater the condensation and loss of pressure. It is therefore obvious that putting the dome on the back end of the boiler is an error, and a waste of fuel. The dome should also be well clothed with felt to prevent loss by radiation.

South Atlantic Squadron.—The proportion of grate to heating surface is from one twenty-fifth to one-thirty-fifth of the entire heating surface in the boiler. It differs with different work, quick working engines requiring more than slow working, just as a locomotive has more fire-box than a stationary boiler.

C. J. S., of N. Y.—What capillary attraction is we can not say. The cause of it belongs to that illimitable domain which lies beyond the present boundaries of human knowledge.

J. P. D., of Mich.—We are much interested in your experiment, and shall publish the account next week. The result is just what we should have anticipated.

J. B. G., of Ill.—You will find a brief description of the process of obtaining spirits of turpentine, on page 344, Vol. X, SCIENTIFIC AMERICAN. The rosin is left in the still after the spirits of turpentine is driven over.

S. I., of Canda West.—If you have a tight pump it will draw the air out of your pipe even if the pipe does rise in a siphon bend several feet above the pump. We have tried this.

J. N., of R. I.—You will have to write to the publishers for the price of Storer's Dictionary, or one of your Providence book sellers will get it for you.

B. I., of N. Y.—Probably the reason why your alcohol did not dissolve the oil was that the alcohol was too weak. Try the 95 per cent.

M. S. B., of Mass.—Your arguments against the invention in question are quite correct, but we do not discuss the illustrations in our columns.

B., of Ill.—We are obliged for your interesting letter on twin screws, and hope we shall hear from you again.

N. B., of Conn.—Henry Carey Baird, of 406 Walnut street, Philadelphia, has published a little treatise on the coal-tar colors by Prof. H. Dusauce. Price $2 50.

Money Received.

At the Scientific American Office, on account of Patent Office business, from Wednesday, Aug. 17, 1864, to Wednesday, Aug. 24, 1864:—

J. D. B., of R. I., $20; W. R. L., of Conn., $20; W. D. M., of N. Y., $41; A. L. S., of N. Y., $20; J. L. R., of Ohio, $20; E. P. N., of N. Y., $20; L. & P., of Ohio, $20; H. & G., of Kansas, $20; S. & H., of Ohio, $20; E. L. W., of Pa., $20; C. A. M., of Ohio, $20; E. H., of Ill., $20; J. A. N., of Mass., $20; J. B., of N. Y., $15; H. W. C., of Conn., $40; S. L. G., of N. Y., $20; M. L., of Ill., $55; L. S. M., of N. Y., $20; C. D., of N. Y., $45; P. S. F., of N. Y., $15; J. H., of Ohio, $15; J. H. S., of N. Y., $25; A. T., of Conn., $10; C. & G., of Mass., $15; J. C. J., of Mass., $15; R. P. B., of Mich., $25; J. S. L., of N. Y., $20; A W H., of N. Y., $20; S. D. D., of Iowa, $20; A. W., of Ill., $20; J. P., of N. Y., $15; S. H., of N. Y., $15; H. F., of Ill., $20; W. R., of N. J., $15; W. H., of Del., $25; R. S. H., of Iowa, $45; L. W., of Ill., $20; G. M. L., of N. Y., $20; G. F. J. C., of N. J., $55; E. B. B., of Conn., $20; F. G. A., of Mass., $20; T. T. & B., of N. Y., $10; D. L., of Vt., $20; E. S., of Vt., $20; J. K., of N. Y., $15; J. G., of Ohio, $25; E. S., of Minn., $25; A. P. A., of Ill., $30; B. L. W., of Ill., $15; J. S., of Ohio, $25; G. & H., of Pa., $31; J. A. McG., of Ind., $16; A. W. C., of Conn., $15; B. K., of Pa., $25; J. W. E., of Del., $16; W. B. P., of Pa., $15; T. W., of Ill., $25; H. W. H., of Conn., $30; E. R., of N. J., $8; P. C., of La., $26; G. & C., of Conn., $15; J. W. B., of Ill., $25; P. C. R., of Mass., $25; G. & G., of Pa., $100; P. J., of N. Y., $30; H. & C., of N. Y., $25; H. J. K., of Conn., $28; H. G, of N. J., $15; S B. H., of Mass., $31; W. H. B., of Iowa, $25; J. R. C., of Pa., $10; P. & B., of Mo., $21; G. F. B., of D. C., $25; E. V. F., of La., $31; J. & N., of N. H., $16; O. T. B., of Wis., $16; C. D., of N. Y., $45; E. N. K. of N. Y., $35; W. G., of N. Y., $30; P. G. B., of N. Y., $25.

Persons having remitted money to this office will please to examine the above list to see that their initials appear in it and if they have not received an acknowledgment by mail, and their initials are not to be found in this list, they will please notify us immediately, stating the amount and how it was sent, whether by mail or express.

Specifications and drawings and models belonging to parties with the following initials have been forwarded to the Patent Office, from Wednesday, Aug. 17, 1864, to Wednesday, Aug. 24, 1864:—

T. W. L., of Cal.; C. V. F., of La.; H. & G., of Pa.; G. F. B., of D. C.; C. & G., of Mass.; A. P. A., of Ill.; E. S., of Minn.; W. H. B., of Iowa; B. K., of Pa.; P. G. B., of N. Y.; J. O., of N. Y.; J. W. N., of Mass.; E. C., of N. Y.; W. D. M., of N. Y.; J. L., of N. Y.; E. N. K., of N. Y.; P. C., of La.; G. & G., of Pa.; H. W. H., of Conn.; J. H. S., of N. Y.; R. P. B., of Mich.; H. P. C., of Mich.; J. S., of Ohio; H. K. J., of Conn.; H. W. C., of Conn.; A. E. W., of N. Y.; F. N., of N Y.; H. & C.. of N. Y.; J. M., of N. Y.; J. W. B., of Ill.; P. C. R., of Mass.

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Believing that the latter style of binding will better please a large portion of our readers, we commenced on the expiration of Volume VII., to bind the sheets sent to us for the purpose in heavy board sides, covered with marble paper and leather backs and corners.

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STATE OF NEW YORK, COMMISSARY GENERAL'S DEPARTMENT, New York, August 9th, 1864.

PURSUANT TO AN ACT OF THE LEGISLATURE of the State of New York, passed April 25th, 1864, Proposals for the rebuilding, alteration, repairing, and reconstruction of the "Brooklyn Arsenal," situated in the City of Brooklyn, N. Y., endorsed "Proposals for the alteration, repairing, and reconstruction of the Brooklyn Arsenal," will be received at the office of the undersigned, corner of 35th street and 7th avenue, in the City of New York, until the 12th day of September next.

Plans and specifications are ready for examination at the above office, and the bids must be for the whole work. The right to reject any and all proposals is expressly reserved, and no contract entered into shall be binding on the State until the same shall have been approved by the Commissioners named in said act.

Good and sufficient surety will be required from the party or parties to whom said contract shall be awarded, to be approved by a majority of said Commissioners.

All proposals received will be opened at the office of the Hon. Lucius Robinson, Comptroller, in the City of Albany, on the 19th day of September next, at 12 M. JAMES A. FARRELL,
7 4* Commissary General of Ordnance, S. N. Y.

TO MINERS AND MINERAL WORKERS.—THE Boston Milling and Manufacturing Company, have erected steam mills and crushers at East Boston, are now ready to execute contracts for crushing and powdering quartz and other ores, of whatever nature, by the tun or by the thousand tuns. They will shortly be prepared, upon the completion of their desulphurizing and smelting furnaces, now in process of erection, to contract for roasting, amalgamating, and refining the precious metals, gold, silver, copper, tin, etc. Being now the sole owners of Whelpley & Storer's several patents for the treatment of minerals, and for the powdering of all hard substances, as bone, coal, fire clay, plaster, foul slag, emery, flint, feldspar, manganese, drugs, dye stuffs, etc., they offer for sale Patent Rights, and machinery for use.

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8 4*

RENSSELAER POLYTECHNIC INSTITUTE, TROY, N. Y The Forty-first Annual Session of this well-known School of Engineering and Natural Science, will commence Sept. 14th, 1864. The Principal Building is completed and ready for occupation. The New Annual Register, giving full information, may be obtained at Appleton's Bookstore, New York, or from Prof. CHARLES DROWNE, Director, Troy, N. Y. 6 8*

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THE SEVENTEENTH ANNUAL EXHIBITION OF the Maryland Institute of Baltimore, for the promotion of the Mechanic's Arts, will commence Monday evening, Oct. 3d, and continue to Monday evening, Oct. 31st, 1864. The Hall will be open for the reception of goods on Monday, Sept. 26th. Goods for competition and premium must be deposited before Thursday night, Sept. 29th. Circulars, embracing details, may be had of the Actuary at the Institute. Communications addressed to the undersigned, or to WM. C. CORNTHWAITE, Actuary, will be promptly attended to.

3 11 W. W. MAUGHLAN, Chairman Committee on Exhibition.

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Coal-mining in China.

The coal pits lie about five miles northerly from Kuh-shan-kau, up a steep ravine or woody opening into the main valley, the path to them rough and stony in the extreme. There are about fifteen shafts open, each of their entrances being enlarged into a room, where the colliers sleep and eat at times, though more comfortable dwellings have been built for overseers and contractors. We engaged a miner to show us down the largest shaft, which measured on the average only 4½ feet high by 5 feet wide; it is cased with willow sticks in a secure manner, and the roof is particularly well guarded. The bottom is lined with the same to form a ladder, up and down which the miners travel in their daily labor. This shaft is about 150 feet deep, and the ladder down to the digging is, perhaps, 600 feet long. The coal is secured on small wooden sledges, and drawn, as the miner slowly crawls up along the narrow and slippery steps, by a strap passing over his forehead, each load weighing 80 cattles. One workman brings up six loads as his day's work. The sides of this shaft showed the width of the veins of coal, but the top and bottom were not dug out; at the bottom the shaft divided and led toward two deposits, but neither passage had been dug out. The whole was very dry, owing probably to its elevation up the hill; but some shafts had been abandoned from wet and bad air, and their mouths closed. The laborers are hired out by contractors, who sell the coal to the dealers coming from Pekin and elsewhere; it is all carried away on the backs of camels or mules, and it is a painful sight to see the unwieldy camels coming down the rocky, uneven road, bringing their loads of coal. It is delivered in Pekin at about three piculs for a dollar, and a large part of the price is for carriage. The coal is hard, but such examination as the time afforded disclosed not a vestige of a stump or leaf to compare with the fossils of other coal regions; more careful research will doubtless bring to light some indications of this kind, enabling scientific men to compare the numerous deposits of soft and hard coal in this part of China with the European coal measures.—*China Mail.*

A Cheap Way to clean Clocks.

Common brass clocks may be cleaned by immersing the works in boiling water. Rough as this treatment may appear it works well, and I have for many years past *boiled* my clocks whenever they stop from an accumulation of dust or a thickening of the oil upon the pivots. They should be boiled in pure or rain water and dried on a warm stove or near the fire. I write this by the tick of an eight-day clock which was boiled a year ago and has behaved perfectly well ever since. C. G. P.

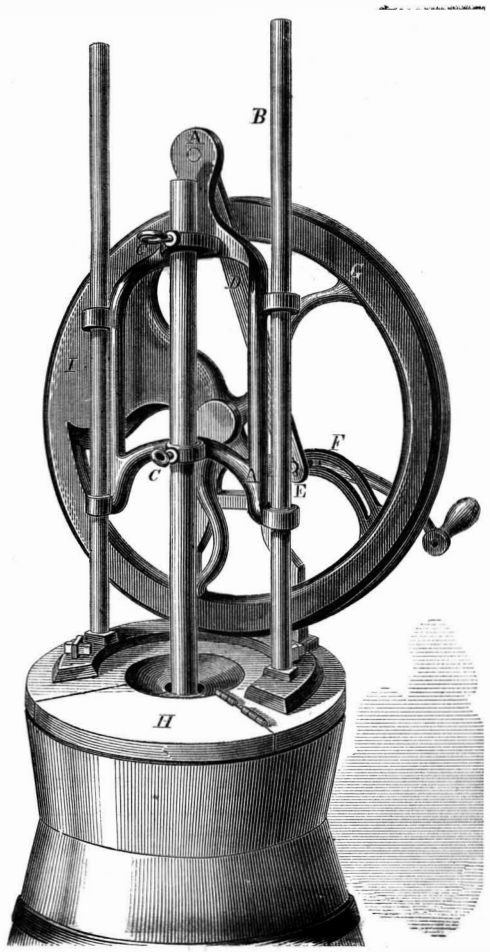
ANOTHER REMEDY.

Although seemingly paradoxical, yet nevertheless clocks are often stopped by being wound up too tight. When this happens apply force, or hang a weight upon the key, as if to unwind the clock, and it will soon get over the difficulty. C. G. P.

PARKER'S CHURN-POWER.

The labor of making butter is very severe, when large quantities of cream are churned, and it is important that it should be lessened as much as possible. The power required to work the ordinary barrel-churn and dasher, is great, calling into action some of the strongest muscles in the frame. From the very nature of the operation it is fatiguing and cannot be long carried on without rest. The constant change of motion up and down, as well as bending the spine so often, conduces very much to weary the churner.

In the engraving herewith published a very simple and efficient arrangement is shown for operating the dasher by a rotary movement, this being by far the easiest way in which muscle can be applied to perform a given amount of work. The rod of the churn-dasher is attached to the frame, A, sliding on the guides, B, by the pins, C. One end of this frame, A, has a lug to which the connecting rod, D, is fastened. The other end of the rod slips over a pin, E, in the slotted arm, F, of the wheel, G. This wheel is mounted in a strong bearing outside of the frame, A, The whole affair is fastened to a common churn-cover, and weighs about 30 pounds. This cover does not need to be lifted on or off as there is a triangular opening, H, in the cover through which the contents can be seen during the churning, and the butter removed and the churn cleaned when necessary. We have not shown this cover open as it would hide other more important parts. The stroke of the churn dasher can be varied instantly, to gather the butter, by slipping the screw, E, in toward the center of the wheel, thus shortening the stroke. The wheel,



G, is also counterbalanced at J, to compensate for the weight of the dasher, so that the wheel moves easily and without jerk or jar. This is obviously a very useful improvement, and will no doubt prove popular, since it will much reduce the labor of churning. It was patented by Jonathan Parker, of Biddeford, Maine. The entire patent is for sale on easy terms. For further information address C. A. Shaw, of the same place.

COOK'S MOLASSES CUP.

Molasses is an excedingly unpleasant substance to handle, and generally manages to smear everything

in its vicinity, unless extra pains be taken. In the summer season this is doubly disagreeable for clouds of flies are attracted by the sweet and annoy one exceedingly. By the use of this cup all such troubles are avoided, and the exterior of it is neither soiled or rendered otherwise unattractive. Instead of being poured out at the top as with ordinary cups, the molasses in this case trickles from the aperture, A, in the bottom, which is closed by a valve, B. This valve is worked by the knob, C, on top; by merely pressing the knob with the thumb, the valve is opened and the contents allowed to flow out. With this cup all the molasses can be drained out, as it naturally runs to the bottom, whereas in turning a vessel up some always clings to the sides and afterward settles to the bottom again. There is a false bottom, D, applied to this cup which keeps insects from getting at the underside. In some of these cups there is a funnel attached to the bottom, so that liquids can be drawn into bottles. It is also useful for drawing beer, as the liquor subsides while the froth swims. It can be made of any material—glass, porcelain, Brittania—metal or tin, and the invention was patented on May 17, 1864, through the Scientific American Patent Agency, by E. R. Cook, of Trenton, N. J., from whom all further information can be obtained.

WHY THE ORGANS WERE MADE DOUBLE.— Dr. Austin Flint, of this city, cut one of the kidneys from a dog of his more than a year ago, and the dog is now perfectly healthy; the urine being secreted by the remaining kidney. It is found that if both kidneys are removed from a dog he will die in about 36 hours.

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